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W.H.O. Expert Committee on Malaria, 5th Report No. 80. June, 1954. 38.

The Malarial Sub-Committee of the Colonial Medical Research Committee's Recommendations on the use of antimalarial Drugs. Brit. Med. J. 1954, ii, 148.

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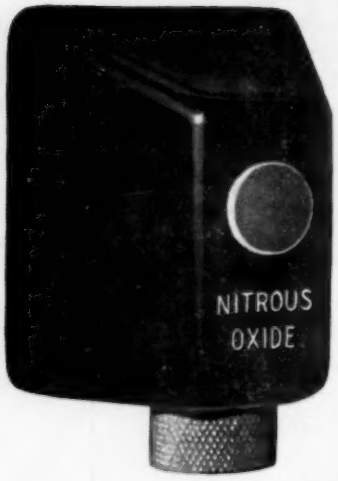

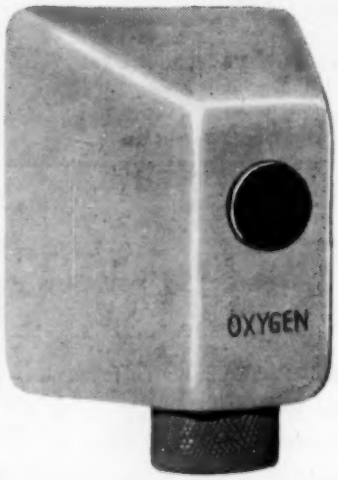

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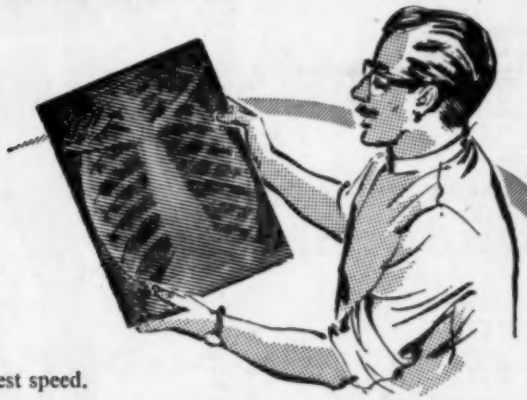

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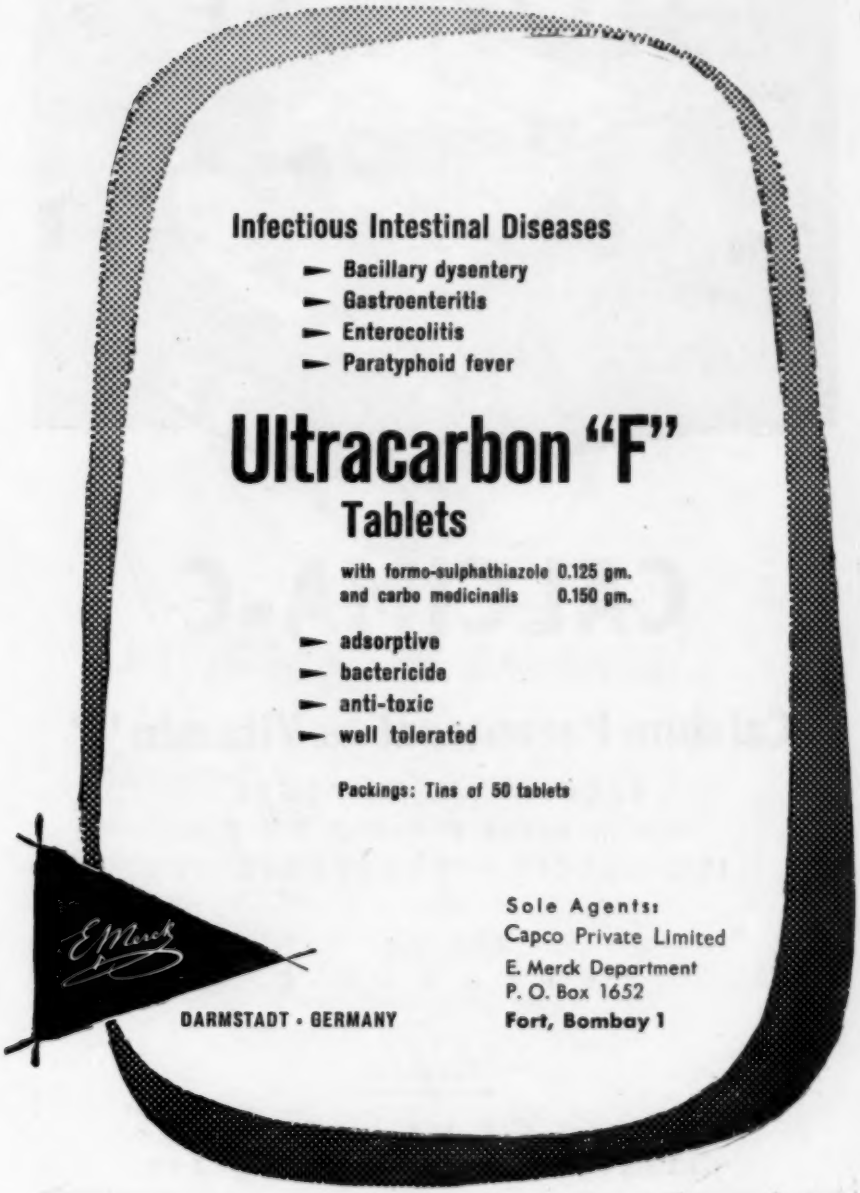
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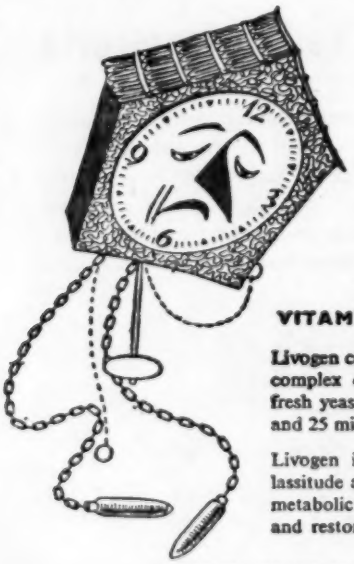

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Journal of the Indian Medical Association

Vol. 26, No. 10 CALCUTTA May 16, 1956
PUBLISHED TWICE A MONTH

ORIGINAL ARTICLES

EPIDEMIOLOGICAL ASPECTS OF THE 1954 OUTBREAK OF ENCEPHALITIS IN JAMSHEDPUR †

S. C. SEAL, M.B.B.S., D.P.H., PH.D., F.A.P.H.A., F.N.I.,

Professor of Epidemiology,
All-India Institute of Hygiene & Public Health, Calcutta

AND

R. N. GHOSE CHOWDHURY, L.M.F., L.P.H. (CAL.),

Health Department, TISCO, Jamshedpur.

In June 1954 the town of Jamshedpur fell under the grip of an epidemic disease proving quickly fatal to children in spite of all treatments. A reconnoitering survey of the town area was started with a view to suggest some immediate measures for control and lines of investigation. On the basis of the preliminary investigations the following tentative conclusions and a working plan for investigation and control were drawn up in collaboration with the local authorities and the workers of Poona Virus Research Centre.

(i) That the outbreak at Jamshedpur was, in all probability, one of viral encephalitis.

(ii) That an arthropod vector might be responsible for the spread of this infection and hence the control of arthropod population should be immediately adopted by means of DDT or BHC.

(iii) That the control work might be carried out by dividing the area into two parts—one for insecticidal operation and the other to remain as untreated control.

(iv) That both clinical and epidemiological information should be collected from the patients admitted into the hospital as well as from those detected in the field and as much as possible from the population at large.

(v) That every effort should be made to isolate the virus from the patients as well as from the suspected vectors.

(vi) That samples of blood should be collected from the patients, suspected cases and certain number of contacts and healthy individuals to study the specific vital antibodies, and

(vii) That the cases discharged from the hospital should be followed up.

Although the town was visited on more than one occasion in connection with the investigation of this epidemic it was not possible to make a comprehensive study due to technical difficulties. Out of 430 probable and possible cases, field investigation in regard to 139 cases only could be completed.

Epidemiological Findings

The epidemic extended to a period of 4½ months from early May to the middle of September, 1954 and the peak was for one month between June 8 and July 9, a large number of deaths (20) being recorded during the period between 12 to 25 June, 1954 (Fig. 1).

† Presented before the annual conference of the Alumni Association of the All-India Institute of Hygiene and Public Health, Calcutta, held in 1955.

Clinical Features

At first it was thought that the disease was confined to children only. Investigation carried out at the hospital and followed up in the field led to the provisional discovery of at least three distinct clinical types of cases, namely, (1) severe toxic or fulminating type, (2) relapsing or diphasic type and (3) abortive or mild type.

Severe toxic or fulminating type—The onset was sudden in healthy and well-nourished children. The common history was that the child was in good health before retiring to bed after the usual night meal. Four to five hours later he got up from sleep as if in a fright crying, with signs of chill or frank rigor, flushed face and congested eyes, fever quickly rising upto 104°—105°F and even higher. Pulse was relatively slow. The child sometimes vomited and/or passed one or two stools, and had twitchings, tremors and convulsions, the latter often becoming epileptiform towards the end. He talked incoherently and became delirious and soon lapsed into drowsiness, semiconscious or unconscious state, though the twitchings and tremors persisted. Respiration became shallower until death supervened by complete cessation of respiration, blood stained froth extruding from the mouth and nostrils at the terminal phase. Neck rigidity, Kernig's sign and exaggerated knee-jerks were common, plantar reflexes often equivocal and abdominal reflexes absent or present. The eyes, to start with, were fixed in a stare with pupils dilated and marked photophobia but towards the end the pupils became pinpoint. There was high leucocytosis generally of neutrophilic type varying from 10,000—46,000 per c.mm. In some cases there was severe hypoglycaemia, C.S. fluid was usually under pressure but cytologically and chemically normal except reduction of sugar level in a few instances. The symptoms were less fulminating in older children. Besides having some of the symptoms mentioned above they often complained of headache and abdominal pains and marked paraesthesia of skin and muscles. Diarrhoea often accompanied the fever and the faeces contained mucus and pus cells. In some cases there was moderate enlargement of lymph nodes with tenderness.

Relapsing or diphasic type—The clinical features were variable but the general characteristic was as follows: An otherwise healthy person usually an adult, suddenly developed high temperature 102°—104°F with chill or rigor, headache and uneasiness, often with generalised aches and pain and with or without slight mental incoherence and exaggerated knee-jerk. Bradycardia was common, eyes were congested and there was considerable apathy. Neutrophilic or lymphocytic leucocytosis varied between 10-25,000 per c.mm. Fever came in two bouts, the first one lasted for 1 to 4 days and after a complete remission for 2 to 4 days it relapsed with other symptoms and came down by lysis during the next 2 to 4 days, leaving the person prostrated and weak and leading to prolonged convalescence. Even a second

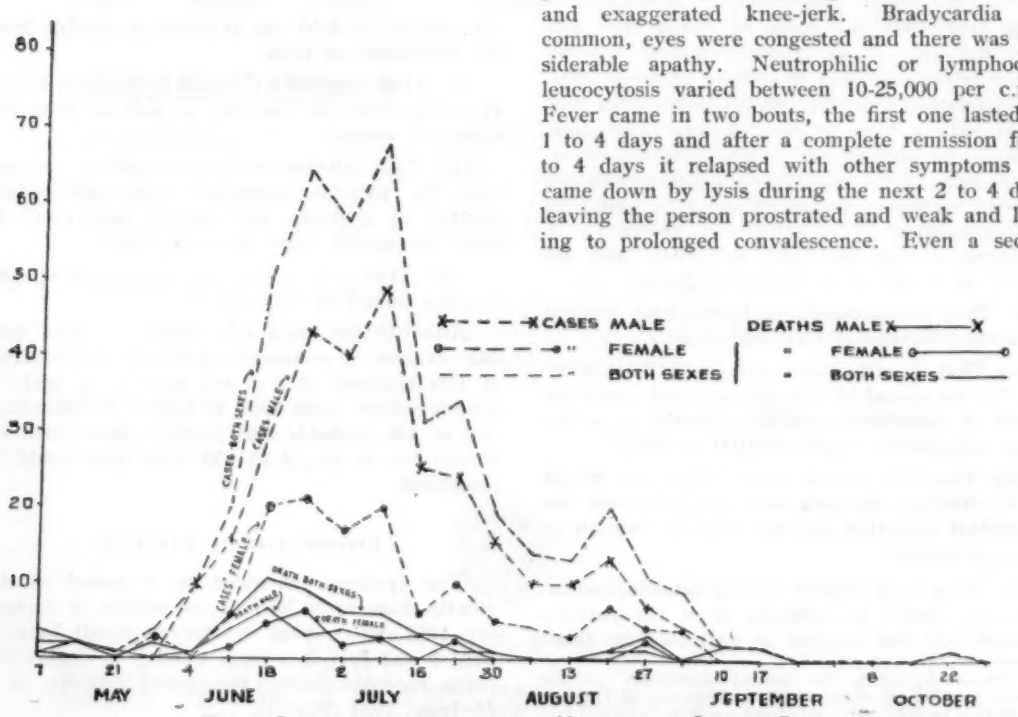

Fig. 1—Showing Case Incidence and Mortality by Sex and Date.

or third relapse was noted in certain cases (Khan, 1954.

Both the fulminating and the relapsing types occurred simultaneously in the same family, the former type affecting the children and the latter usually elderly children or young adults.

Abortive or mild type—This type was usually found among the grown-ups. There was a sudden onset of fever 100°-104°F with shivering, congested eyes and pains and aches, especially backache. It was maximum at onset and lasted for 1 to 6 days. The patients felt greatly exhausted.

There was no death among the relapsing and the abortive types. In these types both clinical and laboratory examinations failed to identify the features with those of any known disease.

The disease was of unknown aetiology and it remained so till the end of the investigation. Hence the cases were regrouped under three main categories on both clinical and epidemiological grounds, namely, (1) typical cases (2) probable cases and (3) possible cases. In the first group were included the fulminating and toxic types ending in death or recovery, in the second all relapsing types and those with fair resemblance in clinical feature with the first group and in the third all mild or abortive types and doubtful cases.

Laboratory Findings

Blood picture—There was an increase of total leucocyte count in 62·4 per cent of cases, the range varying from 10,000-46,000 c.mm. The distribution of total leucocyte count according to the three categories of cases is given in Table 1.

In Table 1 the total leucocytic count of 288 patients is presented. None of the typical cases showed a blood count less than 10,000 per c.mm. as against 13·3 per cent of probable cases and 48·8 per cent of possible cases. In other words, leucocytes were more definitely increased in typical and probable cases than in the possible ones. Differential counts were available for 292 patients. One hundred thirty seven patients, i.e., 46·9 per cent showed neutrophilic leucocytosis and 120 or 41·1 per cent of patients showed lymphocytic leucocytosis and 12 per cent practically normal range. Eosinophils in 9 per cent of patients ranged between 5 to 12 per cent. Among typical cases the neutrophilic leucocytosis occurred in 59·4 per cent and lymphocytic in 32·4 per cent as against 66·7 and 24·4 per cent respectively among probable cases and 40·5 and 46·2 per cent respectively among possible cases. These results are shown in Table 2. It may, however, be mentioned that usually this dual nature of leucocytic increase is not a common feature in the same infection. In the absence of identification of the causative agent this caused no small difficulty in classifying the cases.

Blood sugar level—Towards the latter part of the epidemic hypoglycaemia was discovered as a clinical feature in severe cases. In some of them it was accompanied by a corresponding fall in the C. S. fluid. But it was not a constant feature even in severe cases. The blood sugar levels of 14 fatal cases with repeated estimations in a few of them and 13 non-fatal cases are given in Table 3.

Table 1—Showing Levels of Leucocyte Count per c.mm. Distributed according to the Types (Among 288 Cases Examined)

Count per c.mm.	Typical cases	Probable cases	Possible cases	Total cases
4,000— 7,000 ...	0 (0%)	1 (2·2%)	33 (15·8%)	34 (11·8%)
— 9,000 ...	0 (0%)	5 (11·1%)	69 (33·0%)	74 (25·7%)
—11,000 ...	2 (5·9%)	4 (8·9%)	47 (22·5%)	53 (18·4%)
—20,000 ...	22 (64·7%)	21 (46·6%)	50 (23·9%)	93 (32·3%)
—30,000 ...	8 (23·5%)	13 (28·9%)	9 (4·3%)	30 (10·4%)
30,000 and above (maximum 46,200) ...	2 (5·9%)	1 (2·2%)	1 (0·5%)	4 (1·4%)

TABLE 2—SHOWING THE PROPORTIONAL DISTRIBUTION OF NEUTROPHILS AND LYMPHOCYTES AMONG THE THREE TYPES OF CASES (TOTAL 292 CASES)

Percentage of cell count per c.mm.	Neutrophils				Lymphocytes			
	Typical cases	Probable cases	Possible cases	Total	Typical cases	Probable cases	Possible cases	Total
80 and above ...	14 (37·8%)	14 (31·1%)	21 (10·0%)	49 (16·8%)	0 (0·0%)	0 (0·0%)	0 (0·0%)	0 (0·0%)
—80 ...	8 (21·6%)	16 (35·6%)	64 (30·5%)	88 (30·1%)	0 (0·0%)	0 (0·0%)	0 (0·0%)	0 (0·0%)
—70 ...	6 (16·2%)	8 (17·8%)	78 (37·1%)	92 (31·5%)	1 (2·7%)	2 (4·5%)	5 (2·4%)	8 (2·7%)
—60 ...	7 (18·9%)	2 (4·5%)	23 (10·9%)	32 (11·0%)	0 (0·0%)	3 (6·6%)	15 (7·1%)	18 (6·2%)
—50 ...	1 (2·7%)	3 (6·6%)	18 (8·6%)	22 (7·5%)	4 (10·8%)	0 (0·0%)	9 (4·3%)	13 (4·5%)
—40 ...	0 (0·0%)	1 (2·2%)	6 (2·9%)	7 (2·4%)	7 (18·9%)	6 (13·3%)	68 (32·4%)	81 (27·7%)
—30 ...	1 (2·7%)	1 (2·2%)	0 (0·0%)	2 (0·7%)	11 (29·7%)	16 (35·6%)	85 (40·5%)	112 (38·3%)
—20 ...	0 (0·0%)	0 (0·0%)	0 (0·0%)	0 (0·0%)	13 (35·1%)	17 (37·7%)	27 (12·8%)	57 (19·5%)
—10 ...	0 (0·0%)	0 (0·0%)	0 (0·0%)	0 (0·0%)	1 (2·7%)	1 (2·2%)	1 (0·5%)	3 (1·0%)

TABLE 3—SHOWING BLOOD SUGAR LEVELS IN MG. PER CENT OF CERTAIN FATAL AND NON-FATAL CASES

Fatal						Non-fatal
No. of samples						
1	2	3	4	5	6	
12·5						40·8
12·5	40·2					57·1
20·0 (55·5)						71·4
28·5 (16·3)	284·8*					76·7
33·3 (18·0)						80·0
40·0 (35·3)	301·0*	239·0	228·0	64·8	421·4	85·1
44·4 (31·2)	112·0*	18·2	61·0			88·8
85·5 (78·1)						90·2
93·0 (69·9)						96·4
98·4 (86·8)	109·6*					100·0
121·5 (147·3)	152·3					102·4
125·0 (86·4)						106·4
144·5 (120·4)						125·2
235·2 (68·6)						—

* Estimation repeated after intravenous administration of glucose.

N.B.—The figures in parenthesis indicate the corresponding level of sugar in the cerebrospinal fluid.

In half the total cases as seen from Table 3 the level of blood sugar dropped considerably and in a few cases to a very low level, e.g., 12·5 mg. per cent. In the non-fatal cases, on the other hand, the sugar level dropped in a fewer cases. From these data it appears that hypoglycaemia may be an important contributory factor in determining the final outcome of the infection, and as such it may be considered as a significant observation, although administration of glucose in serious cases did not alter the prognosis in any way in the few cases it was tried.

Cerebrospinal fluid—The sugar levels (mg. per cent) in cerebrospinal fluid of some of the fatal and non-fatal cases which were examined were as follows, arranged in serial order: Fatal cases: 15.0, 16.3, 18.0, 27.1, 31.2, 35.5, 68.6, 69.9, 78.1, 86.4, 86.8, 120.4 and 147.3. Nonfatal cases: 57.2, 68.8, 76.4, 93.6, 110.6. The findings have thus close similarity with the blood sugar levels. No significant change was noticed in the protein and chloride contents of the fluid. Although there was a polymorphonuclear leucocytosis in a large number of probable and possible cases the cells in the C.S. fluid was mostly lymphocytic type without any pleocytosis.

Urine and stool—Albumen was found positive in 35 (13·7 per cent), pus cells in 29 (11·3 per cent) and sugar in 13 (5·1 per cent) patients. R.B.C. was present in three samples only. Of the samples of stool examined from 50 patients as many as 16 cases (32 per cent) showed pus cells and 5 (10 per cent) patients red blood corpuscles. These findings indicate slight damage to the kidneys and not merely febrile changes and there was certain amount of leakage of sugar through these organs. Similarly the presence of pus cells in 32 per cent of the patients may also have some significance in the pathogenesis of the disease whether due to infection or any toxic agent. No pathogen was, however, isolated on culture of urine or faeces.

PROBABLE INCUBATION PERIOD

Three patients including the first gave history of developing the symptoms within 4 days of their arrival at the town from outside places where the possibility of existence of similar cases was eliminated. The minimum incubation period was therefore considered to be about 4 days, if not less.

TABLE 4—AGE AND SEX DISTRIBUTION AMONG ENCEPHALITIS CASES AT JAMSHEDPUR 1954

Age groups in years	Male					Female				
	Typical cases	Probable cases	Possible cases	Total	Fatality rate	Typical cases	Probable cases	Possible cases	Total	Fatality rate
Less than 1 year ...	4	2	7	13 (3)	23·0	6	3	4	13 (6)	46·1
1—5 years ...	19	16	28	63 (10)	15·9	10	4	16	30 (6)	20·0
6—10 ,, ...	31	9	26	66 (17)	25·7	15	3	10	28 (8)	28·6
11—15 ,, ...	7	5	24	36 (2)	5·6	10	4	6	20 (4)	20·0
16—20 ,, ...	4	1	15	20 (1)	5·0	1	0	7	8 (0)	0·0
21 years and above ...	6	12	84	102 (1)	0·98	1	8	22	31 (0)	0·0
	71	45	184	300 (34)	11·3	43	22	65	130 (24)	18·5

Figures in parenthesis indicate deaths.

But the maximum incubation period could not be ascertained except that one patient was said to have developed symptoms 22 days after leaving the town (Khan, 1954).

INCIDENCE AND FATALITY

Of the 893 cases occurring within the period, 430 cases could be placed as follows: (1) 114 typical, (2) 67 probable and (3) 249 possible cases. Epidemiological data were collected for 139 cases by house to house visit during which a large number of fatal and nonfatal cases which did not come to the hospital were detected. The total number of deaths noted was 58 giving a fatality rate of 13·5 per cent. Of the cases, 300 (70 per cent) were males with 34 deaths and 130 (30 per cent) were females with 24 deaths, the sex specific fatality rate for males being 11·5 per cent and for females 18·5 per cent.

Age, sex and religion—The age and sex distribution of the three categories of encephalitis cases is shown in Table 4 and Fig. 2. It shows that the females suffered much higher fatality rates than the males. Except for 2 cases all the deaths occurred among persons below 15 years of age, the two worst affected groups being the infants and those between 5 and 10 years. Of the cases 77 per cent were Hindus, 13·7 per cent Muslims, 5·3 per cent Christians and 4·0 per cent Sikhs. The chronological order of cases and deaths by weeks is given in Fig. 3.

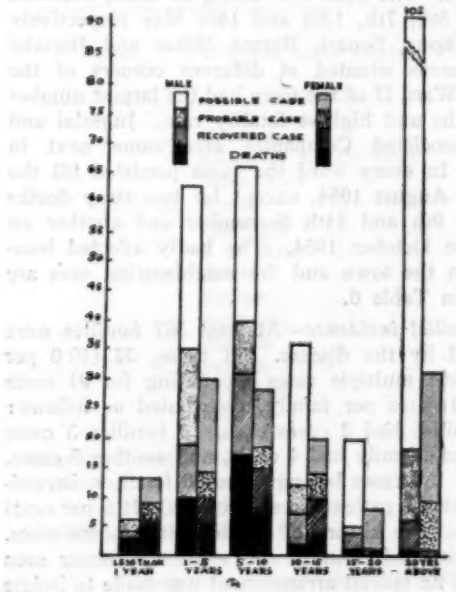

FIG. 2—SHOWING AGE AND SEX INCIDENCE.

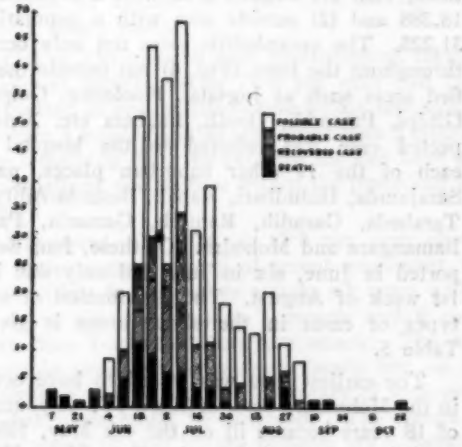

FIG. 3—SHOWING CHRONOLOGICAL ORDER OF CASE INCIDENCE.

FIG. 4—MAP OF JAMSHEDPUR TOWN SHOWING INCIDENCE OF CASES IN DIFFERENT LOCALITIES.

Town and the neighbouring areas—The town of Jamshedpur proper is within the notified areas. The population according to 1951 census is 194,990 (males 108,485). Jugsalai, a neighbouring area abutting Tatanagar railway station, has two sections, viz., (1) notified area with a population of 18,288 and (2) outside area with a population of 31,225. The encephalitis cases not only occurred throughout the town (Fig. 4) but outside the notified areas such as Jugsalai, Hooloong, Golpahari, Gitilpi, Parsudih, Dindli, Bagbera etc. One suspected case was referred to the hospital from each of the 11 other suburban places, namely, Sarajumda, Holudbari, Kapali, Basurda-Adityapur, Tarabeda, Garadih, Ranidih, Gamaria, Padrasa, Bamangara and Mohodra. Of these, four were reported in June, six in July and only one in the 1st week of August. The distribution of various types of cases in the above areas is given in Table 5.

The earliest case was traced to have occurred in the Mohulbera *basti* of Ward IV. A young man of 18 years became ill on the 4th May, 1954 and on being admitted into the Tata Main Hospital was diagnosed as a case of encephalitis, but he survived. The next four cases, all fatal, occurred on the 5th, 7th, 13th and 14th May respectively in Bistupur, Sonari, Burma Mines and Jugsalai bazar areas situated at different corners of the town. Ward II of the town had the largest number of deaths and highest fatality rate. Jugsalai and the Associated Companies area came next in order. In every ward the cases persisted till the end of August 1954, except for two stray deaths on the 9th and 14th September and another on the 21st October 1954. The badly affected localities in the town and the neighbouring area are given in Table 6.

Familial incidence—At least 367 families were affected by the disease. Of these, 37 (10·0 per cent) had multiple cases accounting for 91 cases or 2·46 cases per family, distributed as follows: 23 families had 2 cases each, 12 families 3 cases each, one family had 4 cases, and another 5 cases. Out of 139 cases belonging to 96 families, investigated at the patients' residences, 30 (21·5 per cent) gave definite history of contact with known cases. But cross infection in the ward was never seen though no special arrangement was made to isolate the cases. The total number of members in these

TABLE 5—DISTRIBUTION OF ENCEPHALITIS CASES IN JAMSHEDPUR TOWN AND ITS SUBURBS IN 1954

Areas	Typical cases	Probable cases	Possible cases	Total	Deaths	Fatality rate	Period of prevalence
Town							
Ward I	31	20	59	110	9	8·2	5-5-54 to 30-8-54
,, II	24	8	41	73	19	26·0	5-6-54 to 31-8-54
,, III	31	17	52	100	11	11·0	11-6-54 to 28-8-54
,, IV	16	14	45	75	8	10·7	4-5-54 to 28-8-54
Total of the Town ...	102	59	197	358	47	13·1	4-5-54 to 31-8-54
Areas of Associated companies	5	3	19	27	4	14·8	2-6-54 to 16-8-54 (one stray death on 16-9-54)
Jugsalai notified area ...	1	—	11	12	1	18·8	25-6-54 to 9-9-54
Outside notified area ...	2	—	2	4	2		14-5-54 to 3-7-54
Suburbs (outside notified area)	4	5	20	29	4	13·7	26-5-54 to 20-8-54
TOTAL	114	67	249	430	58	13·5	4-5-54 to 14-9-54 (one stray death on 21-10-54)

TABLE 6—SHOWING BADLY AFFECTED LOCALITIES OF THE TOWN AND ASSOCIATED AREAS

Ward	Localities badly affected	Number of cases
I ...	Bistupur	46 (1)
	Kadma & Kadma Slope	26 (4)
	Farm Area	19 (2)
II ...	Soneri	26 (9)
	Dhatkidih	27 (5)
	B. H. Area	9 (1)
III ...	Sakchi	46 (2)
	Kasidih	16 (4)
	Bhalbasha	16 (2)
	Bhuadih	9 (0)
IV ...	Burmah Mines ...	18 (4)
	Mohulbera	13 (0)
	Sidgorha	10 (2)
	Nawa Line	9 (1)
Associated companies areas	Golmuri	10 (3)
	Agrico	9 (1)
	Telco	7 (0)
Jugsalai ...	Notified area	13 (3)

Figures in parenthesis indicate deaths.

families was 746 i.e. 7·7 members per family. But the number of members in the 28 of these families which had multiple cases was 268 giving the average family size as 9·6 as against the family size of 7·0 for the 68 families having only single cases. The proportion of children among the inmates of families having multiple cases was 51·8 per cent as against 46·8 per cent among these having single cases.

Out of 139 cases, 9 were unvaccinated (against smallpox) infants, 48 or 34·5 per cent had been vaccinated or revaccinated—one within one month, 9 within 3 months and 38 after more than 3 months. The remaining 82 or 69 per cent did not have any anti-smallpox vaccination within the preceding one year.

Movement—Only 24 or 17·2 per cent of the 139 patients gave history of recent movement, six cases within 5 days before attack, six cases within 15 days, six cases within 1 month and 6 cases more than 1 month before the attack. The first traceable case had come from Jamda but on investigation no evidence of occurrence of such cases in that place could be obtained. The names of other places of visit by the patients are: Sahabad

and Basti (U.P.), Arah, Purulia, Chaibassa, Waltair, Sambalpur, and Kharagpur. None of the places had any history of similar incidence of cases at the time of the patients' visit. The duration of stay was as follows: One day—1 case, 1 week—3 cases, 2 weeks—3 cases, 3 weeks—4 cases, 4-8 weeks—4 cases, more than 8 weeks—4 cases, duration unknown—6 cases. Movement in the neighbouring area by the patient was recorded in case of 29 patients (20·8 per cent) and in the city by 6 patients. Only one person being in the railway was frequently moving out.

Diet—Of the 139 cases as many as 12 were breast-fed babies, four of whom were having goat's milk and two others cow's milk in addition. Among the rest, 14 were vegetarians (9 rice-eating and 5 eating both rice and wheat) and 113 non-vegetarians (110 eating both rice and wheat).

Overcrowding—Overcrowding was marked in 25 per cent of the households and ventilation was poor and/or very poor in 33 per cent of the houses visited, particularly in the *bustees*. But detailed studies on these points were not made.

Sanitation—Cleanliness was not satisfactory in 34 instances (24·5 per cent) and was fair or good for the rest. Immediate surroundings were unsatisfactory in 26 or 18·7 per cent cases only. The disposal of night soil was by water-closet with flushing arrangement in the northern town and the outside areas were provided with open bucket type of latrines and in the outskirts and suburbs the people were using open fields.

Ninety seven of the patients' houses in different sections of the city were visited personally for local investigation and collection of certain environmental data. Of the residences, 44·3 per cent were pucca, 26·8 per cent pucca with tiled roof, 22·6 per cent katcha (mud floor and wall) with tiled roof, 3·1 per cent brick or katcha floor with thatched roof and 3·1 per cent katcha floor with thatched roof. Domestic animals were present in 72·2 per cent of houses, 34 per cent of the household were keeping cattle (cows and/or buffaloes), 27·8 per cent goats, 17·5 per cent fowl, 7·2 per cent pigeons, 15·5 per cent dogs and 9·3 per cent cats. Rodents were present in 57·7 per cent houses. In a quick survey insects were found absent only in 7 houses of which four were recently sprayed with BHC. Mosquitoes were found in 80 per cent of households and flies in 94·4 per cent, cockroaches in 26·6 per cent houses, sandflies in 3 per cent and bed bugs in 7·7 per cent houses. Ticks were found in one dog in a house and in some of the fowls. A good section of the patient population gave history of sleeping on the floor, verandah or in the open garden prior to their illness, due to the hot summer climate.

Water supply—The households within the notified area obtained their drinking and domestic water from the town filtered water supply through pipes connected with the mains. The town obtains this water from a reserve lake (*Dimna*) in the hills, a few miles north of the town. The water was filtered and chlorinated before supply. The water supply of the places outside the notified area was from individual wells or tube wells. The unnotified part of Jugsalai, however, began to obtain its water supply from the town mains not very long before the epidemic started (Master, 1955) although the existent surface wells and tube wells were also being used at the same time.

Meteorological factors—Jamshedpur is at an altitude of 550 ft. from the sea level. The average rainfall, maximum and minimum temperatures and humidity per month are given in Table 7 which

TABLE 7—SHOWING METEOROLOGICAL RECORDS OF JAMSHEDPUR FOR THE YEARS 1952, 1953 AND 1954

Months	Maximum temperature (°F)			Minimum temperature (°F)			Humidity (%)			Rainfall (in.)		
	1952	1953	1954	1952	1953	1954	1952	1953	1954	1952	1953	1954
Jan.	88	84	86·5	46·4	44	44	69	72	72	Nil	0·12	0·05
Feb.	96·8	96	95·3	54·2	48·8	54·7	58	65	60	0·3	0·05	0·36
Mar.	103	107	105	58	64·4	53·7	54	47	39	0·4	—	0·02
Apr.	107·8	109·6	111·2	69·8	66·3	68	57	38	37	2·9	0·2	0·03
May	109	114	112	72	73	76·7	63	55	54	1·75	1·3	1·03
June	112	113·6	101	73·8	71·8	74·8	70	72	71	9·75	7·5	5·25
July	97·4	94·2	98	74·7	74·4	76	84	83	79	19·8	16·6	5·00
Aug.	93	92·7	95·1	78·9	73·7	77	82	83	82	9·8	19·8	8·24
Sept.	93·5	93	93·6	78	74·4	74·2	80	81	82	5·5	7·7	7·26
Oct.	93	94	93	72·3	58·3	59	72	76	73	2·8	0·2	1·69
Nov.	89·7	86·4	87	48	53·8	52·6	71	75	68	0·1	3·65	—
Dec.	88	83·2	—	58·5	53	—	76	79	—	—	—	—

shows that there was actually a diminished rainfall in Jamshedpur during the months of May, June, July and August, 1954 as compared with the corresponding months of the previous two years. Humidity was also somewhat lower than in the other years. Whether these conditions had any relation to the prevalence of encephalitis in the town is difficult to say.

Both clinically and epidemiologically the disease appeared to be one of virus infection but not related to vaccinia, smallpox, measles and mumps which were eliminated from the history of the patients. The first working hypothesis adopted was that the disease was transmitted by some blood sucking arthropod as in encephalitis due to Japanese B. or St. Louis, or equine or West Nile viruses. The workers of the Poona Virus Centre made numerous attempts to isolate a virus from the material obtained from the patients and from the insects collected in the field but no virus could be definitely shown to have an aetiological relationship to this Jamshedpur encephalitis. The tests were done mainly in infant mice, inoculated by combined intracerebral and subcutaneous routes. A few rhesus monkeys and chick embroys were also used, but tissue culture facilities were not available at that time. The subject is still under investigation for which processed material from patients and paired samples of sera from these patients and non-cases have been sent to New York. Serological tests done with a large number of arthropod-borne viruses to see if any of the reference viruses was the cause of the disease, also failed to give any clue, as far as reported by Kerr (1955).

The present hypothesis under which the Poona V.R.C. Laboratory is working is that the virus may be an intestinal one, the three known viruses of that group being poliomyelitis, coxsackie and infective hepatitis viruses. From one patient (Puspalata) in Jamshedpur coxackie A virus was isolated but this was not considered as aetiologically related, as antibody against this virus was found fairly distributed among the local population, including some of the probable cases of encephalitis.

Arthropod Vectors

On the hypothesis that the virus might be arthropod-borne it was decided at the outset to try control measures against insects. For this purpose the town was divided into two sectors—experimental and control. Three contiguous localities namely Kadma, Sakchi and Northern Town, with 11,515 houses and 96,559 population were selected for spraying with gammexane p. 520 (50 per cent water wettable powder of benzene hexachloride) and the other part of the town with a population of 155,060 was left unsprayed. The results obtained after 4 months of work revealed that the insecticidal measure adopted had no effect on the incidence of encephalitis, the number of cases coming to the hospital from the two sectors being not significantly different. The results of case to case analysis according to the date of spraying have been tabulated.

Table 8 shows the number and nature of cases admitted into the hospital from the sprayed and unsprayed houses during the same period, i.e.,

Table 8—Showing Number and Nature of Cases Reported from the Sprayed and Unsprayed Houses

Nature of cases	Cases reported after spraying							Total cases reported from the unsprayed houses during the same period	Total cases from unsprayed areas including those reported within 4 days from the sprayed area
	Same day	Within 4 days	Between 5-15 days	Between 16-30 days	Between 31-50 days	Between 50-70 days	Total of reported cases between 5-70 days		
Cases ending fatally	1	0	1	0	1	1	3	13	14
Cases recovered ...	2	1	0	0	0	0	0	14	17
Probable cases ...	0	1	0	4	2	1	7	27	28
Possible cases ...	1	9	12	15	15	1	43	91	101
Total	4	11	13	19	18	3	53	145	160
Doubtful cases ...	0	1	3	0	5	0	8	15	16
Grand Total ...	4	12	16	19	23	3	61	160	176

during July and August, 1954. The ratio of the fatal and recovered cases from the unsprayed houses to those from the sprayed houses was 31 : 3 (i.e., less than 9 per cent). The same for the probable cases was 28 : 7 (20 per cent), for the possible cases 101 : 43 (30 per cent), and for all cases including the doubtful ones was 176 : 45 (20·3 per cent). Excluding the possible and doubtful cases the ratio becomes 59 : 10 (14·5 per cent). From these data the conclusion derived by other workers is not factually supported. Again, of the 53 cases reported from the sprayed houses as many as 19 cases (37·2 per cent) were reported more than one month after the spraying operation. The proportion is still bigger (40·6 per cent) if the doubtful cases are also taken into account. In other words, only a few authentic cases came from the sprayed area. Even so, it does not, however, prove that the insects were aetiologically connected.

Discussion

Several questionnaires may be posed which are involved in the solution of this outbreak, namely, the nature of the disease, its aetiology, epidemiology and the effective methods of treatment.

From the signs and symptoms and other clinical features noted among both fatal and non-fatal cases and their similarity with the clinical features of some of the known types of encephalitis such as Japanese B, Murray Valley, St. Louis, equine encephalomyelitis etc. there was little doubt that the disease was clinically a form of encephalitis. But several special features were noted namely, (*i*) Infants and children, who were otherwise healthy were more commonly affected than the adults and the disease proved fatal to the younger age groups. The nervous symptoms like tremors, twitchings, convulsions and coma were seen only amongst them. They are, however, prone to such symptoms in any acute infection with high temperature. (*ii*) No actual paralysis was noted either in the fatal or non-fatal cases. (*iii*) In the severe and earlier cases an increase in the total leucoyte count ranging between 10-46,000 per c.mm. was noted. This increase showed dual character, being either neutrophilic or lymphocytic type. The severe cases were predominantly neutrophilic. (*iv*) There was no significant change in the C.S. fluid except reduction of sugar in some cases. (*v*) Hypoglycaemia of dangerously low order was noted in half the *fatal* cases. (*vi*) At least three types of clinical cases have been noted. The simultaneous presence of more than one viral infection was not however, unlikely. In fact, not less than 10 cases diagnosed as poliomyelitis (Chari and Swamy, 1955) were also admitted into the hospital during the same period. But so far, the relationship between the Jamshedpur encephalitis and anterior poliomyelitis could not be established and the appearance of both the diseases about the same time seemed only a coincidence. The relapsing and the mild types occurred mostly in adults and older children and caused no fatality. It is not known whether the relapsing type of temperature was noted in any other encephalitis and unlike the saddleback type of temperature in dengue the two peaks of the temperature were separated by complete remission for 1-4 days.

It may, however, be mentioned here that Debré and Thieffry (1955) described a "diphasic" type of onset in poliomyelitis. According to them in certain cases following an initial febrile attack and an initial minor illness there is a period of apyrexia and apparent recovery ; next comes a second attack coinciding with the onset of more definite phase of major illness or 'invasion phase.' But what was observed in the Jamshedpur encephalitis seemed different from this experience. The above two clinical types have been included in the list of cases on the following grounds : (1) simultaneous appearance of severe, relapsing and mild cases in the same family ; (ii) these cases were otherwise undiagnosed and were coming off in large number, i.e., much in excess of what was the normal experience of previous years ; and (iii) one and the same virus infection may cause relatively mild and rather nondescript illness as well as the fulminating attacks very often terminating fatally. As expected, the mild cases were much more numerous than the severe cases. The proof of this however lies in the isolation of the infecting agent itself from them or in the detection of specific antibodies in their blood sera. None of these has so far been successful. The total number of cases likely to be encephalitis, sorted out after due scrutiny, comes to 430.

According to Khan (1954), the disease was a new entity, the like of which he had not seen during the previous 6 years of his stay in Jamshedpur, but though rare he did not deny the existence of stray cases of encephalitis previously admitted into the hospital. The investigation, however, showed that in certain areas, particularly in the two old and congested areas of the town, namely, Bistupur and Sakchi, inspite of high incidence, the fatal cases were very few compared to the other areas (Table 6), the number of deaths recorded being only one and two respectively among 46 accepted cases in each of the above two areas. This may be due to the existence of some low endemic foci in these two areas causing certain amount of herd immunity. No death was also noted in

Mohulbera, Bhuadih and Telco areas among 13, 9 and 7 cases respectively reported from those places.

The general epidemiological features of this outbreak were, occurrence of large number of cases within relatively short space of time, wide distribution of cases simultaneously over the entire town area of 30 sq. miles, affection of all age groups and both sexes with fatality confined to children below 15 years of age, the brunt particularly falling upon the lower age groups, occurrence of multiple cases in 10 per cent of the families though actual cross-infection was not noted in the hospital cases, increased incidence in families with larger number of children and family size (overcrowding), indication of acquired resistance of the adult population by the absence of deaths among them, differential fatality rates in different areas of the town suggesting low endemicity of the disease etc. These considerations led to the conclusion that the disease was infective in origin though direct man to man transmission might not have been occurring. The high fever and hypoglycaemia seen in certain severe cases could as well be due to certain toxic elements of chemical and even of bacterial origin. The epidemiological findings do not, however, fit in with this hypothesis of bacterial toxin although the toxic or incidental encephalitis occurring mostly in children as complication of bacterial infection has been reported in the literature.

In regard to the nature of this infection investigation revealed no evidence of any bacterial, protozoal, or metazoal infection in the blood, urine, faeces and cerebrospinal fluid of any of the patients suspected of encephalitis. Repeated examinations of the clinical material obtained from them proved sterile and the serological tests carried out against *S. typhi, S. paratyphi, Proteus OX 19, OXK* and OX_2, *B. abortus,* and *B. melitensis* were also negative. Blood inoculation tests in animals showed no evidence of leptospiral or rickettsial infection (Khan, 1954). It is also true that extensive bacteriological examination has not been done to cover such an infection as obscure shigellosis nor the exploration was conducted equally in all causes admitted into the hospital. Even so, it is difficult to fit in the hypothesis of bacterial infection with the epidemiological findings. On the same grounds Ekiri, a type of fatal disease reported in Japan by Dodd *et al* (1949), cannot be fitted in. Besides there was no evidence of calcium depletion as tested in a few cases by Chari and Swamy (1955). Non-response of fever and other clinical conditions to various drugs and antibiotics and recovery of majority of cases without administration of these substances also cast doubt about infection with any known bacterium or protozoon. Thus by process of elimination, laboratory investigation and therapeutic trials and on account of the similarity of certain clinical features with the other known virus encephalitides the disease was considered to be of viral origin.

Unfortunately serious and concerted attempts failed to isolate the virus which could be definitely established as aetiologically related. It must be stated in this connection that no autopsy material was available for testing except in a single case. No gross pathological changes (both macro or microscopic) were, however, detected in the brain, liver, kidney, spleen etc. and no virus was isolated by inoculation of these material into the various experimental animals. There was also no glycogen depletion in the liver (Chari and Swamy, 1955).

Coxsackie virus group A type 4 was isolated from the stool of one patient by the V.R.C.L. and subsequently from a few other patients also. Also neutralisation tests in infant mice with six different immunological types of coxsackie group A virus showed that infection with each of these types had been rampant in Jamshedpur but none of the types was considered responsible† for the Jamshedpur outbreak (Kerr, 1955).

According to Iyer (quoted by Khan, 1954) of the Neuropathology Unit of the Indian Council of Medical Research, hypoglycaemia might be the cause of twitchings, tremors or convulsions as well as of the polymorphonuclear leucocytosis as seen in certain severe cases. But it may be pointed out that not in all hypoglycaemic cases the leucocytic response was neutrophilic. In some cases it was lymphocytic. Secondly, the twitchings, tremors or convulsions were present in cases which showed hypoglycaemia and thirdly, these symptoms appeared almost at the very outset of the disease ; fourthly, it was not a constant feature in all the severe cases and even in those in whom it occurred it was found rather unstable or fluctuating. It therefore seems that the condition of hypoglycaemia was rather the effect of the disease and of the convulsions and twitchings rather than their cause. It is true that in those patients in whom the condition was present it caused a very adverse effect on their life and in such cases administration of glucose parenterally was likely to prove beneficial as a remedial measure.

In 5 per cent of patients there was sugar in the urine indicating renal leak and in certain cases this renal leak became apparent after the admini-

† In the latest annual report of V.R.C. for the period ending Nov. 30, 1955 it is mentioned that four acute sera and seven contact sera showed neutralisation antibodies against coxsackie B_4 virus.

stration of intravenous glucose. This might be due to the unusually high blood sugar remaining unutilised or to the possible damage to the kidney or to the physiological derangement brought about by the infection itself and so albumen in the urine samples of more than 13 per cent of patients might not be simple febrile albuminuria, as some of the workers think.

The preliminary investigation revealed that the common insects in the affected houses were flies, mosquitoes and sand-flies, and the slow distribution at the early stages was also suggestive of some arthropod being possibly involved. While the water supply in the town consisted of piped filtered water coming originally from a lake reservoir a few miles north of the town, the suburbs from which the cases also were coming obtained their supply from shallow wells and the border areas partly from the town source and partly from the surface wells. Moreover, all the known virus encephalitis cases previously discovered have been arthropod borne (Hull, 1955).

It was assumed that an arthropod was involved in the transmission of the infection and accordingly all workers at the initial stage of the investigation agreed to work on that hypothesis. The common types of arthropod found in the town of Jamshedpur and the variation in density caused by spraying operations are given in Table 9 (Khan, 1954 ; Chari and Swami, 1955).

TABLE 9—SHOWING THE TYPES OF ARTHROPODS FOUND IN JAMSHEDPUR AND THE VARIATIONS IN DENSITY DUE TO SPRAYING WITH GAMMEXANE

Type of arthropod	June-July unsprayed	Sept.-Oct. unsprayed	Sprayed
	No. per man hour	No. per man hour	No. per man hour
Anopheles culicifacis	0·7	0·8	0·2
,, *pallidus*	+	0	+
,, *stephensi*	0·1	0·2	0
,, *subpictus*	6·5	4·7	1·4
,, *vagus*	0·1	1·8	0·4
Aedes egypti	1·7	2·0	0·2
,, *pipersulatus*	0	+	+
Culex fatigans	1·8	4·8	0·4
,, *gelidus*	+	+	+
,, *tritaeniorhynchus*	0·5	0·7	0·6
Total of all mosquitoes	11·5	14·9	3·4
Phlebotomus papatasii and P. minutus var *antennatus*	5·5	7·8	+
Trombicula deliensis			
B. dellonyssus bursa	+	+	?

+ density less than 0·04 per man hour.

Among the arthropods found *Aedes egypti* and *Culex tritaeniorhynchus* have been associated with encephalitis—the former with encephalitis in Brazil and Uganda and the latter with Japanese B, being least affected by spraying (Table 9). But not necessarily any of these should be the vector in Jamshedpur. However, there were plenty of potential vectors in that town. According to the Poona V.R.C. workers spraying operations created no impression upon the course of the epidemic although the densities of mosquitoes and of sand-flies were very much reduced in the sprayed houses. At one stage the workers, however, thought that the sand-flies might be aetiologically related. The analysis of the dates of admission of cases in relating to the dates of actual spraying operation (Table 8) shows that there was a significant difference in the admission of cases from the sprayed and unsprayed areas (20 : 80 for all types of cases and 8·8 : 91·2 for typical cases). Moreover, 37 per cent of the reported cases from the sprayed area came in more than one month after the spraying operation and it will be seen from Table 9 that the arthropods also began to reappear and were not completely annihilated at any time. The mere fact of irregular distribution of these arthropoda in the town should not entirely rule out the possibility of any one of them playing the role of a vector, nor the failure of isolation of any virus from any one of them should be interpreted as absence of virus in them. It may be that the same difficulty operated in case of isolation of virus from the arthropod vectors as from the human cases. Perhaps, some more consideration was necessary for the collection and examination of mites and ticks. The final curve of the epidemic may fit in as much with the arthropod-borne epidemic as with the poliomyelitis curve of an endemic area (Debré and Thieffry, 1955). From these various considerations it should be seriously considered whether at this stage when no virus could be isolated from any source, human, animal or insect, it would be wise to completely ignore and discard the arthropods, should the disease reappear.

It is premature to discuss the reservoir of virus before the vector or mode of transmission is definitely known. However, on the assumption that the transmission factor might simulate the other known varieties of encephalitis, search for the reservoir was made by the V.R.C.I. workers among domestic animals, fowls and birds (crows, pigeons etc.) but they have not reported any success as yet. Information collected in the fields shows that at least a third of the affected families had cattle, a lesser number had goats and a still less number was keeping fowl, pigeons, dogs and cats. In any

case, in a congested town like Jamshedpur, if any of these animals or birds were acting as reservoir, its presence in every affected family was, of course, not needed.

The workers of V.R.C.L. suggest that the disease is caused by an "intestinal virus" transmitted much the same way as the polio virus. According to this hypothesis, the virus should gain entrance into the system through the gastro-intestinal channel and necessarily water, food or drinks are most likely to be involved. Epidemiological investigations do not however, reveal or suggest any of these items to be the possible vehicle of infection. No items of food except milk came under suspicion but there were large number of persons who became probable or possible cases who did not have milk, and some purely breast-fed babies also became victims along with the other babies who were having cow's or goat's milk in addition to their mothers'. Water was another vehicle which could be suspected. The town having a purified piped water supply the possibility of its contamination though little was not investigated. Secondly, the period of the outbreak was so prolonged that continued or repeated contamination with the infecting virus has to be assumed. Furthermore, cases also arose in the areas not supplied with this piped water but using different water sources. It also raises the question whether the water supply of other towns and cities in which the disease subsequently appeared could have been similarly contaminated.

Certain parts of the town and outside areas have the bucket type of latrine for disposal of night soil and in the outskirts people were using the open fields as well. Flies were also fairly abundant. If the virus was discharged in the faeces and urine there was a possibility of the domestic flies carrying infection mechanically and infecting food, but even so it does not explain the whole outbreak and particularly the cases arising among the breastfed babies of healthy mothers and amongst people of the area provided with flushed latrines. However, the flies were not examined for isolation of the virus. In any case, whatever may be the mode of infection it must be equally applicable to various other places and towns from where the cases were subsequently reported.

In a certain number of cases, particularly in the less severe ones, nasal catarrh and/or sorethroat were noted at onset. In fact, while discussing the matter with the local practitioners they laid stress on the large number of sorethroat cases which they came across in their practice particularly during the initial period of the epidemic in June and July 1954. The objection raised against this droplet or aerial transmission was the absence of cross-infection in the hospital wards and paucity of multiple cases. The final analysis of the data shows that multiple cases were present in at least 10 per cent of the families and there is an association with overcrowding. Even so, multiple cases might also occur if the infection is gastro-intestinal or insect-borne. It is also possible that some multiple cases have been missed due to subclinical infection. The absence of cross-infection in the hospital may be explained by the hypothesis that the infective period may be very short in the early part of manifestation of symptoms or even during the incubation period and by the time the patients were sent to the hospital the virus got fixed resulting in the cessation of the infectivity status of the patient. Besides, cross-infection even in highly infectious diseases is uncommon in modern hospitals. Another point is that even though the virus may be recovered from the faeces the portal of entry may not necessarily be oral. For instance, the Japanese and the Russian workers state that the virus of Japanese B encephalitis can be recovered from blood, C. S. fluid and even urine, faeces or saliva (Olitsky and Casals, 1948). Thus, the possibility of this mode of infection might also be kept in mind, as this might better explain, at the present state of our knowledge, the almost simultaneous or successive outbreaks in several towns of Madhya Pradesh, Bihar, U.P., Punjab and Delhi, taking the recent observations about present day knowledge of influenza in the analogy, as a long term periodic phenomenon.

Without the definite knowledge about the aetiology and modes or vectors of transmission no definite answer can be given to this question. This must await further investigation in future. In the meantime it may not be wise to entirely rule out insects as the possible vector till a definite source is discovered and as long as the above factors are not successfully defined, environmental sanitation measures should continue to remain as the sheet anchor of control measures.

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VIRUS ENCEPHALITIS

(A Clinical Study of 106 Cases)

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Encephalitis is a general term and refers to any inflammation of the brain which can be caused in multitudinous ways, as for example, by bacteria, virus etc. The present study relates to the cases of virus encephalitis admitted in the S. N. Hospital, Agra, in the year 1954.

HISTORICAL

No satisfactory date can be given from which the virus started affecting human beings. But there is no doubt that the virus has caused encephalitis both in the epidemic and sporadic forms from time to time.

Epidemics of this type have been known to occur in Japan since 1871 but it was only since the epidemics of 1912, 1919, 1924, 1929 and 1935 that actual study has been carried out. This was designated as Japanese B encephalitis. It was in the summer season that a large epidemic occurred in 1924, when there were 7000 cases and the mortality was 60 per cent.

Similar epidemics were reported successively from Australia, St. Louis, Balkans, Western Europe, Italy, Russia, Central Africa and Kenya, Argentina, Brazil, Germany, Sweden etc.

In India an outbreak was reported in Bengal (Chatterji *et al*, 1945). In May and June 1954, an outbreak was reported in Jamshedpur, Lucknow and in Delhi towards the last week of July and in parts of Uttar Pradesh in August.

In Agra, sporadic cases were noted since 1941, but from January 1954, the incidence increased as compared to the previous years, and the highest incidence was seen in the months of August and September 1954 amounting to a mild epidemic and a recrudescence occurred also in the month of November 1954.

AETIOLOGY

Seasonal incidence—It is evident from Fig. 1 that cases have been coming practically in all seasons, though the incidence has been high in

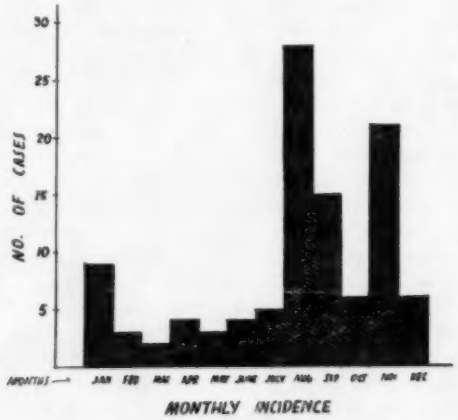

FIG. 1—SHOWING MONTHLY INCIDENCE.

August, September and November 1954. The incidence was low from February to July 1954. It might be mentioned that the cases admitted in July came towards the latter part of this month and the incidence rose after a period of drought and a long spell of hot weather.

Age and sex incidence—No age was found to be exempt in this series. Cases have occurred from early infancy upto above 40 years (Fig. 2) but

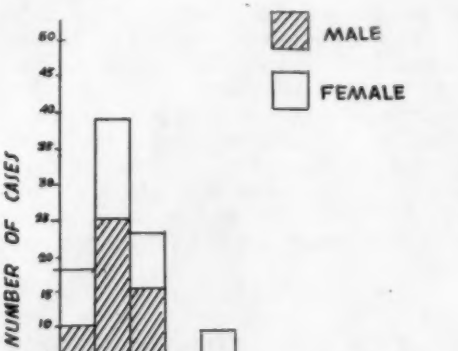

FIG. 2—SHOWING AGE AND SEX INCIDENCE.

the incidence was highest at 1-5 years. Out of 106 cases the total number of cases between 1-5 years was 45 and below 10 years 75. This means practically two-thirds of the cases occurred below 10 years of age, 3 cases occurred above 40 years (Fig. 2). Out of 160 cases, 65 were males and 41 females giving a ratio of approximately 3:2. In a series previously reported, the same proportion was found (Fig. 3).

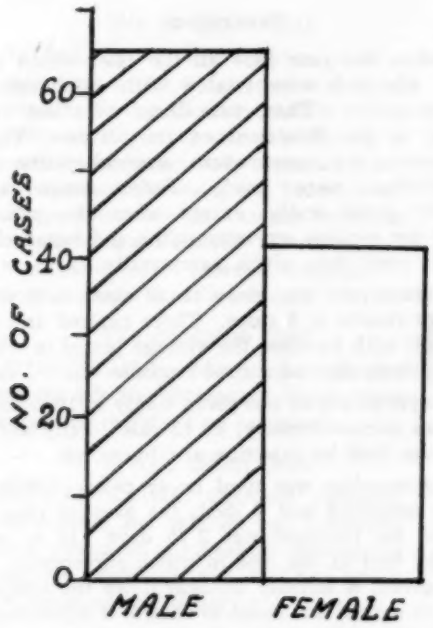

FIG. 3—SHOWING SEX INCIDENCE.

Social status—No two cases were admitted from the same family though a few cases were admitted from the same ward or *mohalla* in the town. For some time it was not possible to isolate the patients in a separate ward for encephalitis and they were admitted in the general wards where cases of other diseases had also been admitted. No case was found to have occurred due to cross infection in the ward and no attendant, nursing staff or doctors contracted this disease. This shows that cross infection did not play an important part in the aetiology of the disease.

CLINICAL FEATURES

Onset—The onset of the disease was sudden in about 60 per cent of cases and insidious in 40 per cent. In the cases where there was a sudden onset the usual history available was a high temperature of 104°-105° or even 106°F. coming on suddenly with vomiting, headache, diarrhoea, convulsions etc. Cases who showed gradual onset suffered for a few days with slight rise of temperature, headache, vomiting, mental irritability and lack of interest in their surroundings or asthenia. Gradually the temperature rose and listlessness became more marked, convulsions resulted or the patients became unconscious.

Symptoms and signs—In the present series fever was present in 99 cases, the temperature ranging from 102°F to 105°F.; in a few cases it rose upto 106°F and in some it was accompanied by rigor. All the three types of fever—continuous, remittent or intermittent—were met with.

The incidence of symptoms and signs are shown in Tables 1 and 2 respectively.

TABLE 1—SHOWING INCIDENCE OF SYMPTOMS

Symptom	Per cent	Symptom	Per cent
Fever	93·4	Inability to speak ...	4·7
Convulsions ...	65·0	Delirium	4·7
Unconsciousness ...	32·0	Rolling of eyes ...	4·7
Diarrhoea ...	31·1	Pain body and neck	3·8
Vomiting ...	28·3	Rigor	3·8
Restlessness ...	9·5	Insomnia	1·9
Cough	9·4	Hiccough	1·9
Twitchings ...	7·5	Diplopia	0·94
Constipation ...	7·5	Partial deafness ...	0·94

TABLE 2—SHOWING INCIDENCE OF SIGNS

Sign	Per cent	Sign	Per cent
Rigidity of neck ...	49·9	Absent deep jerks	4·7
Positive Kernig ...	41·5	Rigidity of limbs	3·8
Extensor plantar ...	24·5	Constricted pupils	3·8
Exaggerated deep jerks ...	17·9	Pupils non-reacting	2·8
Congestion of lungs	10·3	Cyanosis ...	2·8
		Tachycardia ...	2·8

In this series the cases were classified into three types depending on the onset and severity of the signs and symptoms.

1. Fulminating cases where the onset was sudden, with high temperature of 105°-106°F., vomiting, convulsions, restlessness, mental apathy, coma and death within a few hours.

2. Severe cases where the onset was fairly sudden, with temperature of 102° to 104°F., headache, vomiting, restlessness, mild delirium.

3. Mild cases where the initial symptoms were those of slight temperature, headache, occasional vomiting, listlessness etc.

Unusual symptoms—Certain unusual symptoms were noted in some cases. They were: hemiplegia (1·9 per cent), paraplegia (1·9 per cent), paralysis of 3rd cranial nerve (0·94 per cent), choreiform movements (2·8 per cent), verbal aphasia (4·7 per cent), dimness of vision (1·9 per cent), hallucination and delusions (3·8 per cent), difficulty of swallowing (1·9 per cent) and jaundice developed in 2 cases (1·9 per cent). It might be noted that some of the cases of virus encephalitis came with the symptoms of the unusual type which have just been mentioned; as for example, two cases were admitted with hemiplegia which suggested in the beginning, an attack of cerebral thrombosis but on clinical examination and supported by bacteriological examination the cause was found to be virus encephalitis.

With the institution of antibiotic therapy the general condition improved, the temperature declined and along with that the hemiplegia also cleared up. Similarly in two cases in which paraplegia was the presenting symptom it improved with the improvement of the general condition.

In two cases jaundice resulted during the course of treatment. It cannot be said with any certainty whether the jaundice was due to the same virus causing encephalitis and also injuring the liver, which resulted in a hepatitis or a different virus altogether was responsible for causing the jaundice. It might also be argued that the antibiotic treatment might have been responsible, for causing the jaundice, for both these patients were on tetracycline therapy. But no other case where tetracycline had been given for the treatment of other diseases in other wards did develop jaundice.

Laboratory Investigations

Blood—Total W.B.C. count was done in 102 cases. Leucocytosis above 12,000 per c.mm. was present in 47 cases. Total W.B.C. count between 9,100 and 12,000 per c.mm. was present in 34 cases and in 21 cases the count was below 9,000 per c.mm. There was polymorphonuclear leucocytosis in 53 cases and lymphocytosis in 14 cases. Widal reaction was also done in a few cases with negative results. The routine and cultural examination of blood, urine, and throat swab and ordinary examination of stool, all gave negative results.

Cerebrospinal fluid—Cerebrospinal fluid was under tension in most of the cases. Cell count was between 21—50 cells per c.mm. in 29 cases and above 51 cells per c.mm. in 10 cases. In one case, the highest recorded was 380 cells per c.mm. The nature of the cells was not studied. In 60 cases sugar was on the higher side of normal, in 33 cases it was average normal and in 5 cases it was decreased, but it was never absent in any case. Chloride was normal in 70 cases and low in 28 cases. Protein was normal in 35 cases and high in 63 cases. The C.S.F. culture, gave negative results.

Treatment

Before the year 1954 all the cases which had been admitted were treated with sulphonamide and penicillin. These two drugs were not very useful in the treatment of this disease. Three antibiotics, viz., aureomycin, oxytetracycline and tetracycline were tried. These drugs were usually given orally, except when the patients could not swallow oxytetracycline and tetracycline which were then given parenterally.

Aureomycin was given to 10 cases with satisfactory results in 6 cases. Three expired and one was left with legacies, the average period in which the patients showed a good response was 3·2 days.

Oxytetracycline was given singly in 19 cases, in 7 cases intramuscularly, in 12 cases orally and in 13 cases both by injection and by mouth.

Tetracycline was used in 45 cases. Thirtysix cases improved and 9 died, the average time required for response was 2·75 days. It is noteworthy that in one case in which aureomycin was first given, it initially brought down the temperature to normal but failed to control it subsequently but a remission followed within 48 hours after administration of tetracycline.

A comparative account of the results obtained with antibiotics is given in Table 3.

Table 3—Showing the Results of Treatment with Antibiotics

Antibiotic	No. of cases	Cured	Expired	Days by which temp. came down
Tetracycline ...	45	36 (80·0%)	9 (20·0%)	2·75
Oxytetracycline				
Injections ...	7	3 (42·8%)	4 (57·8%)	?
Capsules ...	12	7 (58·3%)	5 (41·6%)	?
Injections and capsules ...	13	6 (46·2%)	7 (53·8%)	2·8
Aureomycin ...	10*	6 (60·0%)	3 (30·0%)	3·2

* 1 case left with legacies.

talking of Panaceas

We do not claim that
TETRACYCLINE DUMEX
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Thirtyeight cases out of 106 cases expired giving a fatality rate of 36 per cent. The fatality in the different age groups is shown in Fig. 4. Of the fatal cases 63·2 per cent expired within 12 hours of admission and 36·8 per cent after 12 hours. This shows that the first group did not get a chance to get the dose of the antibiotic in adequate concentration.

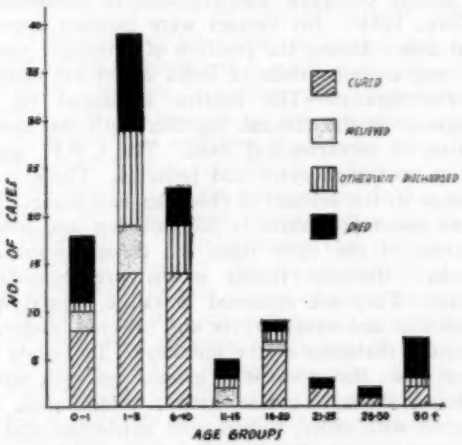

Fig. 4—Showing Results of Treatment by Age Groups.

Conclusion

The cause of encephalitis has been attributed in this series of cases to a virus aetiology, on account of the changes in the blood (leucocytosis), blood films negative for malarial parasites, and negative blood culture and changes in the C.S.F. The C.S. fluid was generally under tension, and clear though with increase in the cell (lymphocytic content), sugar was a bit low in a few cases, normal in some and on the higher side of normal in the majority of cases ; proteins were raised but the chlorides were unaffected and C.S.F. culture was always negative.

It was not possible to get a postmortem done inspite of our best efforts. It could have afforded a valuable help in the understanding of pathogenesis of the disease. It is certain that the sporadic virus encephalitis has been occurring in our country for several years, at least the author has been noticing it since 1941 at Agra. So this is not a new disease nor is it a mysterious one.

Why it should appear in a mild epidemic form in July-August 1954 cannot be satisfactorily answered but probably a long spell of summer and drought may be an important factor. From the incidence, having appeared increasingly with the onset of rains, it is very likely that some insect vector, e.g., mosquito or sandfly, plays an important part in the propagation of the disease.

The disease is not contagious as has been observed from these series of cases. No case was drawn from the same family. In the wards also the contiguity of the patients of this disease with other patients did not prove to be a factor in the propagation of the malady. For there was no attendant, relative, nurse or doctor who developed any sign of the disease—hence contagion does not appear to be an important factor in its transmission.

Those who suffered from it came from the poorer or middle class families who lived in damp unhygienic localities in the ground floor, where sunshine and adequate ventilation were not available, hence the disease appears to be associated with insanitary conditions. Whether the disease was conveyed directly to a healthy person or the virus which might be lying dormant in them flared to activity, due to the lowered vitality of the individual cannot be said with any certainty. Probably both are possible factors in the aetiology of the disease.

Whether the type of virus responsible for the causation of the encephalitis occurring in Northern parts of India is the same as that of Japanese B or St. Louis viruses cannot be satisfactorily answered at this moment. With slight variations in the age incidence of the disease in the July-August mild epidemic, it is possible that the virus causing encephalitis might be a different one or at least a different strain of some known virus. It is suggested that it should better be designated Northern India encephalitis virus.

Summary

1. A clinical study of 106 cases admitted in the year 1954 has been presented.

2. There occurred an increased incidence in the month of August, September, November and January in the form of a mild epidemic at Agra. In sporadic cases, the seasonal incidence was not found of any importance.

3. Children were mostly affected in the mild epidemic of July-August, 1954 whereas in the sporadic cases occurring since 1943 the disease affected persons of other ages as well.

4. Contagion does not seem to play an important part in the disease. There was no secondary incidence or cross infection in the wards.

5. It is suggested that the virus may be called the Northern India encephalitis virus.

6. The mortality rate came down by the use of antibiotics. Of the three antibiotics mentioned tetracycline gave the best results.

ACKNOWLEDGMENT

I am thankful to Dr. H. N. Bhatt, Principal and Superintendent, Medical College and Hospital, Agra, for his kind permission to carry on the investigations and publishing the results.

I am also thankful to Dr. R. K. S. Dhariwal, my house physician, and Dr. M. T. Lal, research scholar, for helping me in completing this work. I am also thankful to the Lederle Laboratories for supplying me achromycin brand of tetracycline used in some of these cases.

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SPECIAL ARTICLE

CURRENT TRENDS IN THE LABORATORY DIAGNOSIS OF VIRUS INFECTIONS

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During the past decade considerable advances have been made in the methods for the study of virus infections. The advent and wide applications of tissue culture techniques, high speed centrifuges, electrophoresis and electron microscopy have all provided a highly satisfactory means for the isolation, purification and immunologic study of the viruses. Generally speaking two types of methods are employed in the diagnosis of virus infections. (1) Retrospective ; consisting of a search for antibodies against known viruses—such procedures include virus neutralisation, complement fixation and haemagglutination tests. (2) Prospective, consisting of the search for viruses, their isolation and cultivation from the blood or other pathogenic material from patients.

The purpose of this communication is to discuss and evaluate the various diagnostic procedures in different virus infections.

Viral encephalitides—Recently a study of arthropod-borne virus infections in India was made under the Indian Council of Medical Research at the Central Virus Research Laboratory, Poona. Virus neutralisation tests were carried out against each of the 15 known arthropod-borne virus in the sera collected from individuals in different parts of South India and the results reported. (Smithburn *et al*, 1954). In this communication antibodies against yellow fever, Bwamba fever, and Bunyamvera viruses were not found. Neutralising antibodies were, however, found against West Nile, St. Louis encephalitis, Zika, Uganda S, Ntaya, Japanese B encephalitis, Murray Valley, Ilheus and Semliki forest viruses. Still more recently there was an epidemic of a type of encephalitis 'mystery disease' supposed to be of viral aetiology. All attempts at isolation of the virus by inoculating in different animals and the demonstration of antibodies against known arthropod-borne viruses failed. Taneja *et al* (1955), however, believe a few cases to be of Japanese B encephalitis, on the basis of the histopathological lesions. A similar outbreak was reported in Jamshedpur (Khan, 1954). No viruses were isolated even at that time. Hence the position of aetiologic agents of viral encephalitides in India is not yet certain.

Poliomyelitis—The routine employed for its diagnosis is the clinical together with the examination of cerebrospinal fluid. The C.S.F. shows a rise in lymphocytes and proteins. There is no change in the amount of chlorides and sugar. The more exact procedure is the isolation and identification of the virus from the throat swabs and stools. Multiple throat swabs are considered better. They are squeezed in saline, mixed with penicillin and streptomycin and injected bilaterally into the thalamus of the monkeys. To isolate the virus from the stools it is ground up with saline, filtered through coarse gauze, centrifuged, extracted with ether, mixed with antibiotics and inoculated into monkeys mostly intracerebrally, sometimes intranasally or intraperitoneally. The inoculated monkey is observed for any untoward symptoms. The onset of the disease is indicated by an early rise of rectal temperature, tremors, ataxia, paresis later on followed by complete paralysis. It is during the early period when the symptoms suggestive of experimental poliomyelitis develop that the animal is sacrificed. Histopathology of the spinal cord shows destruction of anterior horn cells and neuronophagia together with perivascular lymphocytic infiltration.

The poliomyelitis virus is now being isolated by tissue culture methods. Trypsin dispersed monkey kidney cells are prepared and standardised according to Youngner (1954) to give a concentration of about 0·4 mill. cells per c.c. These cells are then suspended in a mixture of Hank's solution, 5 per cent lactalbumin hydrolysate, sterile inactivated calf serum and antibiotics like penicillin and streptomycin. The tubes are kept slightly inclined 5 degrees from the horizontal. Good growth is obtained within seven days of inoculation of virus infected material. This is recognised by virus induced cell degenerations. This technique is simple, economical, obviates the use of animals, the presence of virus is readily recognised by cytopathogenic changes and the virus yield is higher. Salk *et al* (1954) have used the colour change of

phenol-red as the indicator in titrating poliomyelitis virus or its antibody in the tissue culture system. This is based on the fact that the metabolic activity of normal actively growing monkey kidney cells in culture tubes is evidenced by a fall in pH. When virus is added, the cells are destroyed and fall in pH halted. Lipton and Steigman (1955) have used a colorimetric test for titration of poliomyelitis virus and antibody. At present there are no satisfactory immunologic tests available for identification of the poliomyelitis virus.

Aseptic meningitis—This is caused by coxsackie group of viruses in a number of cases. The coxsackie viruses resemble the poliomyelitis viruses. For the isolation of the coxsackie viruses 10 per cent faecal emulsion is made in sterile distilled water. This is centrifuged at 3000 r.p.m. for 10 minutes. 5 c.c. of the supernatant fluid is then subjected to high speed centrifugation at 13000 and 18000 r.p.m. This increases the yield of the virus about 100 times. The supernatant from the high speed centrifugate is mixed with penicillin and streptomycin and injected into each of a litter of new-born mice subcutaneously into the dorsum just below the neck or intraperitoneally. The mice are observed for paralysis everyday for 15 days. Usually if infection is present the mice come down in seven days' time. Histological examination of the tissues shows evidence of generalised myositis. This group of viruses can also be isolated by adding the infected material to monolayer cultures of trypsin treated monkey kidney tissue. Positives are judged by cytopathogenic changes in the cultures. Duncan *et al* (1955) isolated the coxsackie and unidentified cytopathogenic viruses from the C.S. fluid by employing the tissue culture methods in 52 cases of aseptic meningitis.

Herpes simplex—The presence of herpes simplex virus in herpetic lesions of the oral cavity is shown by the demonstration of intranuclear inclusions in epithelial cells of scrapings obtained from the gums and mucous membrane of the cheeks. According to Blank *et al* (1951) a virus type multinucleate giant cell is present in scrapings of the peripheral portion of vesicles in herpes simplex, herpes zoster and varicella. The herpes simplex virus can be easily cultivated on the chorio-allantoic membrane of the developing chick embryo. Immunologic tests like complement fixation and virus neutralisation can also be carried out on patient's sera.

Mumps—The ultimate diagnosis is based on the clinical evidence of infection together with the isolation of virus (Habel, 1945), by inoculating a specimen of saliva and infusion broth into the chick embryo. Among immunologic tests complement fixation test is the procedure of choice. A rising titre has definite diagnostic value.

Rabies—One seldom needs to use the laboratory methods for diagnosing a patient of hydrophobia. The clinical symptoms themselves are so characteristic as to clinch the diagnosis. It is only in rabid dogs or other animals that the diagnosis of rabies needs a confirmation. Usually impression smears are made from the hippocampal area of the brain at postmortem and 'negri bodies' are looked for. Because of the longer time required in their preparation histopathological sections are rarely employed for the diagnostic demonstration of 'negri bodies'. Further confirmation may be done by the isolation and identification of the rabies virus. It is isolated by intracerebrally inoculating into mice a saline suspension of glycerol preserved brain tissue. If rabies virus is present then the mice show tremor, incoordination and then flaccid paralysis between the sixth and eighth day. The mice are, however, observed for symptoms at least for 30 days. Their brains are later on examined for 'negri bodies.' Immunologic tests are of little value in the diagnosis of rabies.

Influenza—The diagnosis of influenza is made both by the isolation and identification of the virus as well as immunologic tests. The virus is usually isolated from the pharyngeal washings. Nasal washings are not good specimens. Nasal and throat swabs are popular with Australian workers. Chances of the isolation of the virus are much better with the throat washings. Patient gargles at least for three minutes, spits out in a wide-mouth bottle and 5 c.c. broth is immediately added to it. If it has to be sent to a laboratory, the best thing is to pack in ordinary ice, otherwise, inoculate the eggs immediately. Amniotic inoculation is best for the influenza viruses. When the virus has grown the amniotic fluid is harvested and tested for the presence of haemagglutinins. The presence of haemagglutinins in itself is a good evidence of the influenza virus but the better thing is the demonstration of haemagglutination inhibiting antibodies and typing the strain with various antisera. The complement fixing and haemagglutination inhibiting antibodies appear as early as the 5th or 6th day and persist in low titre upto a year or more. Both the acute phase serum (before sixth day) and convalescent serum (10th to 14th day) are collected and tested for complement fixing antibodies. For diagnosis it is necessary to demonstrate a fourfold rise in complement fixing antibodies in convalescent serum.

Virus pneumonia—The causative virus has not been isolated. The possibility of streptococcus MG. being an aetiologic agent has not been

entirely given up. The reproducibility of the disease by using bacteria-free filtrates strongly supports the virus hypothesis. There are two laboratory methods which are useful in its diagnosis (1) Cold haemagglutination test (ii) Agglutination for streptococcus MG.

Laurell (1948) studied 112 cases of suspected primary atypical pneumonia which showed a positive cold agglutination reaction. He found that the earliest positive cold agglutination reaction was obtained from 8th—28th day, majority occurring in 2nd and 3rd weeks. The maximum titre was obtained from 10th day onwards to 4th week.

Psittacosis—The clinical manifestations of psittacosis are not sufficiently characteristic to enable diagnosis through them alone. The isolation of the virus from the blood or sputum is a tedious procedure and not easily achieved. Between 1945 and 1953, 481 specimens of clinically and serologically proved cases of psittacosis were examined and only 4·7 per cent yielded a viral agent. The test of choice is usually the complement fixation test. It must be stressed that only an antigen prepared from yolk sac infected with a psittacosis strain should be used. The antigen prepared from the fertile eggs infected with the L.G.V. virus or commercial 'Lygranum' should not be used. At present the complement fixation test carried out with the antigens of uniform potency on acute and convalescent serum is the only quick and simple means available for making an early diagnosis of psittacosis. A diagnostically significant titre may not be reached until the thirteeth day of convalescence. A rise in the titre of complement fixing antibodies in the convalescent serum is much more important.

Lymphogranuloma venereum—The methods used in the diagnosis are (i) microscopical examination of the bubo pus for elementary bodies, (ii) pathological examination of granulomatous lesions for the presence of stellate abscesses, (iii) complement fixation test with the L.G.V. antigen, (iv) skin sensitivity test with Frei antigen. It may, however, be stated that the elementary bodies are usually difficult to recognise with certainty in the bubo pus. Regarding complement fixation and the Frei test, Bedson *et al* (1949) concluded that the titres of 1 in 32 or over in the complement fixing antibodies made with steamed lymphogranuloma venereum virus and the sera from patients in whom the clinical findings are compatible with the diagnosis of lymphogranuloma venereum suggest active infection with L.G.V. virus. The Frei test indicates only infection with a virus of psittacosis-lymphogranuloma group of viruses. A positive Frei test with a positive complement fixation test of 1 in 16 or over is a good evidence of active L.G.V. infection.

Trachoma—The ultimate diagnosis of trachoma is made upon the clinical picture assisted by the finding of cytoplasmic inclusions in the epithelial cells. For this purpose the epithelial scrapings usually from the upper tarsus or expressed trachoma follicle material is obtained and stained for elementary bodies. So far no immunologic tests have been developed for the diagnosis of trachoma. Recently conjunctival grafts have been done in the chorio-allantoic membrane.

Smallpox and chickenpox—The early diagnosis of smallpox can be made from the following tests: (i) Microscopical examination of scrapings from the base of the skin lesions for elementary bodies, (ii) complement fixation test to detect either the antigen or the antibody in the patient's blood; (iii) virus culture on the chorio-allantoic membrane of fowl's eggs, the inoculum being the blood in first two or three days of illness or material from the eruptive lesions on the skin. In the complement fixation test a varicella antigen is always included as a negative control. The complement fixation test distinguishes variola-vaccinia group from varicella, herpes zoster, and herpes simplex but not variola from vaccinia. It is possible to differentiate between variola and vaccinia by inoculating blood or scrapings from skin lesions on to the chorio-allantoic membrane. In varicella there is no growth while in variola and vaccinia there are distinct and distinguishable lesions.

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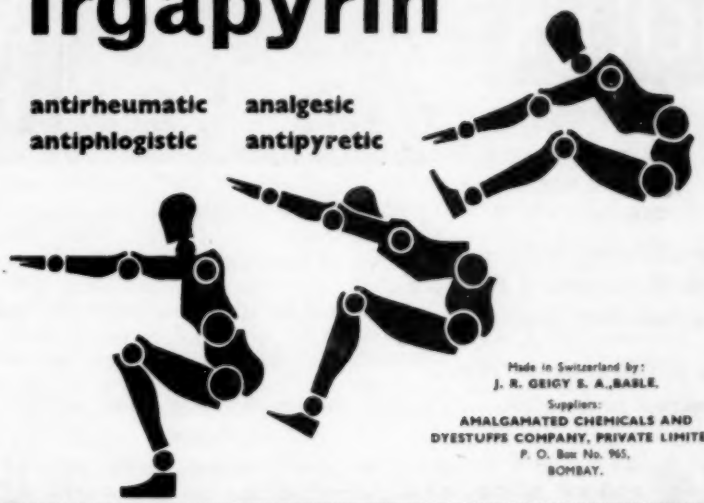

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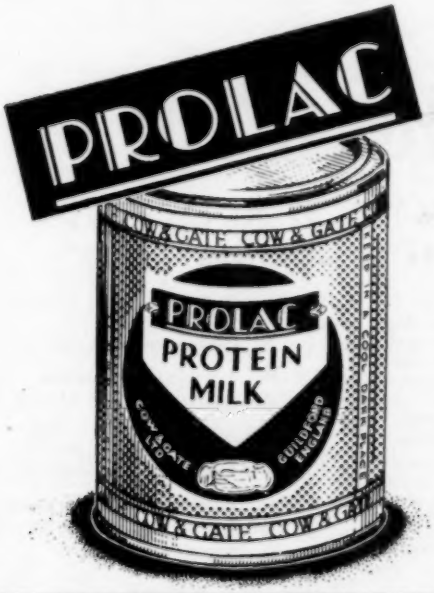

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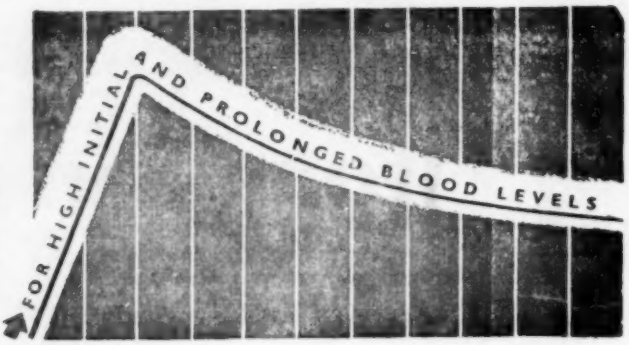

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CALCUTTA, MAY 16, 1956

VIRAL ENCEPHALITIDES

Viral encephalitides are fairly widely distributed in the world. The last Epidemiological Report of the W.H.O.[1] shows that in 1952 the disease was prevalent in Australia, 22 countries of Europe, 17 of the North and South Americas, 16 of Africa and 13 of the Asiatic continent. The numbers of cases or deaths reported from some of these countries are: Japan—3545 cases, U.S.A.—1912 cases, South Korea—1221 cases, Germany—197 cases, Australia—70 cases, South Africa—66 cases and France—253 deaths, Columbia—159 deaths, Thailand—98 deaths. India was recently subjected to several encephalitic outbreaks which stirred the medical profession and no less the Government and the public. It has never been an unknown disease in India as references to this type of malady are found in the oldest available Ayurvedic literature. Only the aetiological role of various agents were not known or defined.

Although the knowledge about them, mostly acquired within the last twenty or thirty years, is still in the nascent state it is now fairly established that encephalitis may be caused by physical means, chemical substances and infective agents or their toxins, these infective agents may be protozoa, fungi, bacteria, spirochaetes, rickettsiae or viruses. The most important of these are the viruses causing much larger number of epidemics and greater havocs in the country than the other agents. Thus viral encephalitis has eventually assumed greater importance from the public health point of view. Before the aetiological factor was defined the disease was generally known by the names of the place of occurrence, e.g., St. Louis, Japanese B, Australian X, Russian Far East, West Nile, Murray Valley encephalitis etc. Since 1930 many epidemics of such diseases have been reported from different parts of the world.

The viruses causing the clinicopathological condition are referred to as neurotropic, attacking mainly the nerve cells and the nervous tissues. There are, however, different degrees of neurotropism, some being highly neurotropic like the poliomyelitis or rabies viruses, and others only ordinary neurotropic such as Japanese B and equine encephalitis etc. In the former case, the viruses can only be found in the central nervous system and not at all or with a great deal of difficulty in other tissues, blood, secretions or excretions except in case of poliomyelitis in which the virus can be easily isolated from the faeces. Even so, it does not necessarily indicate that the virus multiplies elsewhere than in the neural material. The general pathological picture, however, depends on the reaction of the susceptible cells to the viruses and on the parts of the nervous system affected. Injury or death of the susceptible cells are followed by an inflammatory reaction as manifested by neuronophagia, cellular infiltration about the blood vessels, meninges and nervous tissues, proliferation of glial cells, areas of haemorrhage and necrosis in the ground substance of gray or white matter. The disease may thus manifest itself in one of the four clinicopathological forms, namely, encephalitis and meningo-encephalomyelitis. One or more than one manifestation may be seen in one and the same epidemic. In fact, it is difficult from pathologic examination of the nervous system to make a definite diagnosis of a particular type of encephalitis. As the viral encephalitides became better known some of them were designated, on the basis of common characteristics, as summer encephalitis, endemic or epidemic virus infections of CNS and lately as arthropod-borne viral encephalitides.

While there is no doubt that viral diseases must have been existent from antiquity its evolutionary phases of recent dates can only be traced. Thus it may be stated that epidemics of encephalitis have been known to occur in Japan since 1871 but was forgotten till it reappeared in 1912 and subsequently in 1919, 1924, 1929, 1935 and 1945[2]. It was actually recognised as viral encephalitis in 1924 when as many as 7000 cases were reported with 60 per cent deaths; but the virus was isolated in 1935[3, 4, 5] under the name Japanese B as

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opposed to Japanese A or Von Economo's epidemic encephalitis lethargica. Similar epidemics occurred in Australia[6] in 1917-18 with 70 per cent deaths and again in 1922, 1925 and 1926 under the name Australian[6] X disease. The virus isolated was perhaps lost before identification but the disease is now believed to have been caused by Japanese B encephalitis virus. In 1887, poliomyelitis which also causes encephalitis, occurred in epidemic form in Stockholm as described by Medin in 1891. Other human encephalitides with dates of first reported human epidemic are encephalitis lethargica-Von Economo[7], Western equine[8, 9], St. Louis[10, 11], Russian Far East[12], Eastern equine[13, 14], Venezuelan equine[15, 16] and acute primary haemorrhagic meningo-encephalitis[17, 18]. There are also a number of non-epidemic encephalitis such as, louping-ill[19], lymphocytic choriomeningitis[20, 21], Swinherd's disease[22] etc. which at times affect man. Non-epidemic encephalitis may also be caused by other viruses which are not normally encephalitogenic, e.g., mumps, measles, influenza, herpes simplex, dengue, yellow-fever, varicella, variola, lymphogranuloma venereum etc. Besides the above there is another important group of encephalitis (post-infection encephalitis) which, though rare, may occur after vaccination against smallpox and rabies.

In India, sporadic cases have been observed by many physicians from time to time and also treated in hospitals. The first important epidemic of encephalitis was recorded in Bombay[23] and the physicians described it as one of encephalitis lethargica although cases had been earlier reported by Chatterji *et al*[24] who had treated 89 patients during the course of three years, 1942-44, in the Calcutta Medical College Hospital. From the clinical description it seems to have close resemblance to the Jamshedpur epidemic and the authors themselves differentiated it from that of encephalitis lethargica. Of the other epidemics reported in the literature before 1954, mention may be made of the trickling of encephalitis cases in the Agra Medical College Hospital between 1941 to 1953, as reported by Gour[25], and of the 87 cases of encephalitis treated in J. J. Hospital, Bombay, during 1952 and 1953, reported by DeSouza[23], of which 76 cases were considered to be of viral origin. The biggest recent epidemic, however, occurred between June to October 1954 in the town of Jamshedpur and was reported in this Journal[26] and also by Khan[27], Kerr[28], and Chari *et al*[29]. Similar outbreaks were reported within that period from a large number of towns and cities in India, namely, Bilashpur and Nagpur in Madhya Pradesh, Mysore[30], Monghyr and Patna in Bihar, Allahabad, Lucknow, Kanpur, Agra[25], Hardoi, Bareilly and Sitapur in U.P., Panipat, Sonepat, Shahabad, Ambala, Pondro, Kaithal and Karnal in the Punjab[31] and also from Delhi, i.e., covering a fairly wide area of the northern part of India.

The points of importance and interest, therefore, are the sudden and simultaneous appearance of the disease in epidemic form, the epidemiological factors involved, methods of diagnosis, treatment, prevention and control and the future implications. Some of these points have been discussed by Seal in his report on the epidemiologi-

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[8] MEYER, K. F.—*Ann. Int. Med.*, **6** : 645, 1932.

[9] HOWITT, B.—*Science*, **88** : 455, 1938.

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[24] CHATTERJI, J. R., GUPTA, N. AND DE, M. N.—*Indian M. Gaz.*, **80** : 285, 1945.

[25] GOUR, K. N.—*Agra Med. Coll. J.*, **7** : 35, 1954.

[26] Editorial, *J. Indian M. A.*, **24** : 23, 1954.

[27] KHAN, NAJIB—*Indian J. M. Sci.*, **8** : 597, 1954.

[28] KERR, J. K.—Annual Rep. Virus Research Centre, Poona for 1953-54, 1954.

[29] CHARI, M. V. AND SWAMY, T. V.—*Brit. M. J.*, **2** : 1298, 1955.

[30] PIERCE, D. B. M.—*J. Indian M. A.*, **24** : 232, 1954.

[31] MATHUR, T. N.—*Ibid*, **24** : 379, 1953.

cal aspects of the Jamshedpur outbreak published elsewhere in this issue of the journal[32]. There is also another paper on the subject by Gour[33] dealing with the clinical aspects of 106 cases admitted in the Agra Medical College Hospital in 1954. Both these papers give some interesting data. These authors from their respective angles have shown that the disease is not a new one. Less or non-vulnerability of the adult population generally indicate clinical or subclinical infection with homologous or allied virus in childhood. In Agra, cases have been treated since 1941, but the question arises whether the spell of outbreaks observed all throughout India in 1954 and the cases observed in Agra since 1941 were due to one and the same aetiological factor. This brings us to the important issue—the causal agent.

Although all workers in the field are almost unanimous in their opinion about the vital aetiology of the disease, no virus has so far been definitely established to have the aetiological role so far as the 1954 outbreaks are concerned. In this respect the workers in the Poona Virus Research Centre deserve congratulations for their concerted and persistent efforts to isolate the virus. They were, however, much handicapped for want of postmortem material. Their Annual Report for the period ending the 30th November, 1956 contains valuable data in this regard. It is interesting to note that the investigation carried out by them of an outbreak of encephalitis occurring between September and November 1955 in the North Arcot District of Madras led to the establishment, by serological and animal tests, of Japanese B virus being responsible for that outbreak. This was perhaps the only outbreak reported in 1955. Even here, attempts to isolate the virus have so far failed. It may be that the virus needs sustained and repeated passage for adaptation to the experimental animal like mice or monkey, or it may yield to some other technique of isolation. Attempts to isolate the virus from the Lucknow cases by Mukherji *et al*[34] were also unsuccessful. However, the latest hypothesis in regard to the Jamshedpur outbreak upon which attention has been focussed by the workers at Poona, is that the virus may be an enteric one. Several viruses have been isolated in this connection, namely, coxsackie A_4 and certain orphan viruses, and lately evidence of specific antibodies against coxsackie B_5 virus has been discovered in some of the sera collected at Jamshedpur and at Delhi. This last virus is known to cause encephalitic symptoms.

Apart from the question of the nature of virus involved those who had the experience of the Jamshedpur outbreak expressed the opinion that the Lucknow and Delhi cases were clinically of the same type, but except at Agra, the cases were confined mostly to children below 15 years. It may be that mild, abortive or diphasic cases noted in Jamshedpur were either missed or did not come to the hospital. Gross difference in familial incidence and some differences in the signs, sequelae and biochemical reactions have been noted at Agra and other places with those of Jamshedpur outbreak. On the other hand, the South Indian outbreak of 1955 in the North Arcot District has been described as clinically different from that of Jamshedpur and ascribed for the first time in India to Japanese B virus. Thus there is a suggestion that the whole of the North Indian outbreak of 1954 was different from the South Indian outbreak of 1955 and it assumes the hypothesis that more than one virus are at work in India at the present moment causing encephalitic outbreaks. The workers at V.R.C. have also discovered antibodies against dengue, West Nile and Japanese B virus among the population at large in Jamshedpur and in and around Calcutta.

It may be interesting to note here that summer encephalitis shows itself generally in definite areas of the globe each type occurring within specific geographical boundaries, but depicting serological overlapping among certain viruses of the group. The difference noted in the clinical characters and modes of prevalence are due to the probable differences in environmental factors, species of vector and reservoir to which the virus becomes adapted and the reaction in the human host. In these reasons, it has been postulated that "the virus may have a common ancestor which on dissemination over the world has been acted upon by innumerable factors, perhaps the latter serves to impress certain changes reflected in serological and immunological reactions."

In regard to the question of transmission the problem has remained unsolved so far as the 1954 outbreaks are concerned. In the absence of evidence of man to man transmission investigators at Jamshedpur, after a preliminary reconnaissance, considered that a common blood sucking arthropod infected by human or non-human reservoirs could act as a persistent source to give rise to a continu-

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[32] SEAL, S. C. AND GHOSE CHOWDHURY, R. H.—*Ibid*, **26**: 371, 1956.

[33] GOUR, K. N.—*Ibid*, **26**: 384, 1956.

[34] MUKHERJEE, B., *et al*—Personal communication, 1955.

ous and diffused distribution of cases geographically and in time (nearly 4½ months)—a period corresponding to the summer encephalitis of other countries. But from the results obtained by insecticidal measures and from the failure of isolation of any virus from the insects collected in Jamshedpur the V.R.C. workers abandoned the hypothesis of insect vector and switched on to the idea of enteric infection.

The isolation of coxsackie A_4 virus from the faeces of some of the patients and the discovery of antibodies against it in the general population, though not connected with the encephalitis outbreak, are considered by them as evidence of the existence of a mechanism working in that town which could cause widespread subclinical infection by that virus. No serious comments can, however, be made on this hypothesis unless some idea is obtained about the mechanism which could affect the breastfed babies, the children and the adult persons alike. In Seal's opinion, however, the statistical consideration, if anything, is rather in favour of the insecticidal measure which should not be thrown out without further investigation. Moreover, the failure to isolate the virus from insects according to him may have the same basis as the failure to isolate it from the active cases. These are points for guiding our future action.

The phenomenon of sudden and almost simultaneous appearance of the disease in epidemic form after a long (in this case unknown) period of quiescence has now been recognised. This is perhaps the characteristic of the secular trend of all communicable diseases and particularly those of virus origin. It has to be left to the future knowledge of the ecology and genetics of viruses and bacteria which are perhaps the most primaeval and the least known living creation on the earth, for clarification of this behaviour. The plan for such studies has not yet fully crystallized but once seriously taken up is likely to throw a flood of light on the host-parasite relationship.

Some workers, however, want to place the blame on the improvement of sanitation preventing opportunities for subclinical infection and immunity, others put it to the indiscriminate use of antibiotics which are destroying microbial flora and fauna of human body, perhaps helpful in striking a balance with or in maintaining an antagonism to the viral infections. In any case, whatever may be the immediate cause the phenomenon is essentially of host-parasite relationship.

The diagnosis has so far been mainly based on the clinical signs and symptoms and the negative laboratory findings. The sudden onset with rapid evolution of neurological symptoms in an otherwise healthy child or a person without any premonitory warning and rapid ending in some cases may be due to the peculiarity of growth relationship of the virus to the neuron cells of the hosts. Possibly a threshold value of damage has to be reached for symptoms to develop and once these are developed the ultimate outcome is dependent upon the extent of damage to the nerve cells and to the strength of the host against the viral metabolites, and no drug is probably effective at that stage. Indeed, absence of any specific drug is a great handicap for the physician to tackle such cases. If any apparent benefit has been accrued to any antibiotic by any physician it may be safer to assume that the results are independent of the antibiotics. The treatment thus remains purely symptomatic. In regard to the question of prevention and control the matter is still in the fluid state without the knowledge about the virus involved and the mode of transmission, and so long these points remain unknown one has to depend on the existing methods of control.

As to the future implications warning was already sounded in an editorial in this journal[26]. Strict vigilance should be maintained of any outbreak that may arise anywhere in India and it is for the medical profession to bring it immediately to the notice of the public health authorities of the Government and the research workers in the field for instituting prompt investigation to evolve better methods of diagnosis, treatment and control, to isolate the virus and to elucidate the transmission agents involved.

CURRENT MEDICAL LITERATURE

Cardiovascular Collapse in Acute Poliomyelitis

HILDS AND OTHERS (*Circulation*, **12** : 986, 1955) from a study on a series of 22 fatal cases and 6 surviving cases of cardiovascular collapse in acute poliomyelitis observe :

Clinically, the syndrome came on acutely within 1 or 2 days after the onset of bulbar paralysis. It was characterized by apprehension, hyperthermia, fast regular pulse and was sometimes preceded by a short period of hypertension. It then progressed to a state of shock with cold, sweating and cyanosed extremities. Pulmonary oedema was a common terminal feature.

At autopsy, there was involvement of the medulla in all cases and pulmonary oedema in all but one case. Interstitial myocarditis was found in 75 per cent of the cases.

Treatment with noradrenaline appeared to be of benefit in some cases but this was usually transient. Four of the six surviving cases had a mild form of the syndrome.

It is suggested that the mechanism for the syndrome is a combination of vasoconstriction resulting from a medullary lesion and a viral myocarditis. This leads to acute heart failure and pulmonary oedema.

Thiourea Derivatives in Thyrotoxic Children

KUNSTADTER AND STEIN (*A.M.A. Am. J. Dis. Child.*, **90** : 373, 1955) give in the following lines the summary of their observations on the treatment of thyrotoxic children with thiourea derivatives :

During the past 12 years we have treated 17 cases of mild to severe primary hyperthyroidism in children with thiourea derivatives. Five were submitted to subtotal thyroidectomy : only one because of drug failure, the others for the following reasons : (1) marked enlargement of the thyroid, (2) psychotic episodes and cardiac complications during early treatment, (3) poor cooperation from a badly disturbed child, and (4) development of a nodule in the thyroid suspected of being a neoplasm. Twelve patients have been followed under medical treatment alone. Of these, six have been in remission for five years or more ; two have been in remission for two to five years, and four are still under treatment.

Prolonged treatment of from 6 to 36 months was administered to the eight patients in remission. These children tolerated large doses without evidence of toxicity. We believe that initial large doses result in earlier response, lessen the likelihood of early relapses, and may shorten the duration of treatment.

In all the patients followed in remission for long periods of time, growth and development, including sexual maturation, progressed normally through puberty into adulthood.

On the basis of our observations in this relatively small number of cases, we believe that attempts at prolonged treatment with thiourea derivatives are justified for the following reasons :

1. 'Cures' of five years or more can be anticipated in a large percentage of patients.
2. Growth and development, including sexual maturation, progress normally during treatment and subsequent prolonged remission.
3. The possible complications of surgery and the sequelae of disturbed endocrine balance resulting from thyroidectomy may be avoided.

Insensible Water Loss

HEELEY AND TALBOT (*A.M.A. Am. J. Dis. Child.*, **90** : 251, 1955) in reporting on 596 measurements of the insensible water loss per square meter per 24 hours by 39 patients ranging in age from 2 months to 23 years living under the nonbasal conditions characteristic of ordinary hospital living observe :

The results obtained indicate a gradual decline in total nonbasal insensible water loss values from an average of approximately 1200 ml/sq. m/day in young infants to approximately 700 ml/sq. m/day in older adolescent and young adult subjects. The over-all average for patients 2 months to 16 years of age was 930 ml/sq. m/24 hours. Three-fourths of the average values obtained for the patients making up this group were within ±325 ml/sq. m/24 hours of this over-all average value. The fact that rate of insensible water loss of non-febrile patients may change by as much as 1000 ml/sq. m/24 hours within a day is illustrated by detailed observations on one patient.

It is concluded from these observations that it is practicably possible to make only an approximate estimate of the total insensible water loss of hospitalized patients. In considering the total water needs of the ordinary patient, whose neurohypophyseal-renal homeostatic system is functionally adequate, an average allotment of 1000 ml. of water per square meter per 24 hours to cover insensible losses would appear reasonable. On the other hand, in patients who have lost the normal capacity to retain and reject water in accordance with homeostatic needs by appropriate adjustments in urine water output it becomes of considerable importance to attempt to estimate insensible water losses as closely as possible, making larger than average water allowances for infants under 2 years and smaller than average allowances for persons over 8 years of age.

Effect of Reserpine in Newborn Infant

BUDNIK AND OTHERS (*A.M.A. Am. J. Dis. Child.*, **90** : 286, 1955) write from observations on a group of 13 newborn infants that in 12 of these infants reserpine had been administered to the mothers prior to delivery. Their clinical symptoms are described, and it is concluded that reserpine may have an untoward effect in the newborn, manifested by nasal discharge, retraction, lethargy, and anorexia.

Portal Hypertension in Infants and Children

HSIA AND GELLIS (*A. M. A. Am. J. Dis. Child.*, **90** : 290, 1955) give in the following lines the summary of

their observations on a total of 43 cases of portal hypertension in infants and children seen at the Children's Medical Center over a 30-year period :

Twenty-one of these were found to have primary portal hypertension due to extra-hepatic obstructions. A history of omphalitis and sepsis during early infancy, early haematemesis and splenomegaly, the absence of clinical jaundice, and frequent depression of the blood elements were prominent features of this type of portal hypertension. Of the six coming to autopsy, all had anatomical lesions which could account for the condition.

Twenty-two others were found to have portal hypertension secondary to cirrhosis of the liver. Hepatitis appeared to be the commonest aetiological agent, and in many of these cases liver function tests were usually strongly positive.

Venous shunt appears to be the treatment of choice in children with primary portal hypertension. Since the prognosis of those with secondary portal hypertension appears to be uniformly poor with supportive therapy alone, it is felt that venous shunt should also be employed in this group of patients.

Cirrhosis of Liver in Infants and Children

CRAIG AND OTHERS (*A.M.A. Am. J. Dis. Child.*, **90** : 299, 1955) write that it is apparent that this disease differs greatly from cirrhosis seen in children in other parts of the world. None of the cases in the present series showed the massive hepatic necrosis described in Hindu children or the enlarged fatty livers seen among the children with kwashiorkor in Africa and the West Indies. This is not surprising in view of the fact that none of the children in the present group suffered from either protein or vitamin deficiency to any marked degree. It was interesting to note also that none of the cases showed evidence of the classical Laennec's cirrhosis, which is the commonest form of cirrhosis among adults. This may be due to the absence of alcoholism and severe nutritional disturbances in children, or it may represent a difference in response on the part of the liver in infancy and childhood. Instead of becoming damaged and replaced by fibrous tissue over a long period of years, the liver may either regenerate rapidly and completely or show rapid necrosis and degeneration without a marked regenerative process.

The primary causes of cirrhosis of the liver in infants and children in this part of the world are hepatitis and congenital malformations of the biliary tree. Although the latter is not unusual in a pediatric population, the frequency of cirrhosis associated with hepatitis is a surprising and important one, suggesting that the disease is not entirely benign among children. This emphasizes the importance of recognition of mild and subclinical cases without icterus and also of careful follow-up of known cases after signs and symptoms have disappeared. Yet, in view of the large number of patients with acute infectious hepatitis in this area before and during the period covered by this survey, it is obvious that cirrhosis is a relatively uncommon complication of hepatitis in childhood.

The diagnosis of cirrhosis in galactosemia is relatively rare. This condition, however, should always be considered in the differential diagnosis of cirrhosis of the liver in children.

Foetal Hepatitis

AIKAT AND SEN GUPTA (*Indian J. M. Sc.*, **10** : 169, 1956) report on eight cases of foetal and neonatal hepatitis born of mothers suffering from acute infective hepatitis, during a recent epidemic.

The mode of transmission of the virus of infective hepatitis through the transplacental route has been established.

The significance of these observations in the aetiology of cirrhosis in infancy and childhood has been discussed.

CURRENT TOPIC

MEDICAL COUNCIL OF INDIA

In course of his presidential address at the 45th Session of the Medical Council of India, on 10th March, 1956, Dr. C. S. Patel said :

Retrospective recognition of qualifications—Under Sec. 11 (2) of the Indian Medical Council Act, any medical institution which grants a medical qualification not included in the First Schedule may apply to the Central Government to have such qualifications recognised, and the Central Government, after consulting the Council, may by notification amend the Schedule so as to include such uqalification therein. Under Clause (3) *ibid* such notification may also direct that an entry be made in the last column of the Schedule against such medical qualification declaring that it shall be a recognised medical qualification only when granted after a specified date. Accordingly after satisfying itself through inspections, the Council had recommended to the Central Government the recognition of the qualifications of certain Universities/Licensing Bodies from a specified date, on which the Council was convinced that the standards were sufficient. The Central Government notified the recognition accordingly and the General Medical Council also accorded recognition in such cases in the same manner. In order to get over the disability of medical graduates entailed by non-recognition of their qualifications prior to recognition by the Council, at its last meeting the Council had recommended to the Central Government a procedure, as a special case, whereby recognition might be accorded after certain training. According to the notifications now issued by the Central Government in this behalf the dates which were specified previously have been deleted. The effect is that these qualifications are now recognised retrospectively from the date of their institution. This decision of the Government, which has been directly communicated to the respective Universities/Licensing Bodies and the State Governments, is in utter disregard of the considered views of the Council. It is really a question of principle, viz., whether it is justifiable to give retrospective effect to the recognition of a qualification or qualifications obtained in a year, when the standards of equipment, personnel and teaching of the institutions concerned were not adequate and the standard of the exa-

minations of the institutions concerned was low and left much to be desired. In my opinion, the giving of such retrospective effect indiscriminately, as has been done by the Government of India, creates a very awkward precedent and is bound to give a set-back to the efforts of the Council to improve standards in Medical Colleges, as the authorities of such colleges will feel that they can go slow in meeting the demands of this Council and the Universities concerned in connection with the maintenance of proper standards and yet expect to get retrospective recognition from the Government of India to the qualifications obtained by studying at such institutions. There is also the question that it will give a bad impression to bodies outside India with whom we have reciprocal arrangements for recognition of Medical qualifications granted in India and the respective countries.

Conference on Medical Education—You will recall that at the last meeting the Council had given careful thought to the Conference on Medical Education convened by the Government of India. In the resolution which was adopted by the Council, it was pointed out 'that whatever may be the decision of the aforesaid Conference it is the Medical Council of India who has to consider, examine and recommend to the authorities concerned the implementation of such decisions, as the findings of such a Conference as contemplated by the Government cannot prove effective in laying down the uniform standard on medical education in different parts of India.' This is a statement of facts and nothing more. The members of the Council have whole-heartedly co-operated with the Government and have taken part in the Conference. The Government have forwarded to us as well as to the Universities and State Governments the recommendations of the Conference. Since the Council has already forwarded in its routine duty its own recommendations on all these matters to the Universities and Medical Colleges previously and as they are being implemented now, naturally the recommendations made by this Conference and forwarded by Government directly are bound to create confusion and undermine the position of the Council in such matters. I do not think it is presumptuous on our part to assert that any proposal of Government or any other body relating to medical education and standards should first be considered, and commented upon by this Council before it is implemented. As the Government of India have themselves stated that the Medical Council of India have an important role to play in such matters, this makes it all the more necessary that this body is given adequate powers to function effectively in its sphere of work and that its considered views are given due respect. Your Executive Committee after careful thought have decided to draw the attention of the Government to the procedure adopted in this case and to protest against such a procedure. As regards the recommendations of the Medical Education Conference forwarded by the Government to us, your Executive Committee have found that action has already been taken by the Council on most of these recommendations. The recommendations would however be considered later in detail and if there would be any suggestions which have not already been considered, they would be communicated to the Government.

M.B.B.S. (Osmania), recognition of, from a specific date—At its meeting held in October 1953, the Council had decided that a specific date of recognition be given to the qualification of M.B.B.S. (Osmania) whereby its recognition would be effective only when granted after the 15th August, 1951. The Central Government did not agree to this recommendation and the matter was referred back to us for reconsideration. It was referred by the Executive Committee to the Inspection Reports Sub-Committee who did not favour recognition, with a remote retrospective date. The Executive Committee in October 1955, reconsidered the position and adhered to the decision already made by the Council in October 1953. The Government was informed accordingly, but it has informed the Council that it does not consider it necessary or desirable at this stage to impose any such condition. This means that the qualification will be recognised with retrospective effect from 1932, i.e., the retrospective effect will go back to 19 years. This again is a matter where the considered opinion of the Council has been disregarded.

Post-Examination training—We have provided for post-examination training under our revised recommendations on Professional Education. The training required is for 12 months in cases where there is 1½ years pre-clinical course and six months where this course is for 2 years. In order to explore the feasibility of utilisation of the hospitals other than teaching ones, the information received with regard to civil and military hospitals in the States was considered by your Executive Committee. The Committee have decided for collection of further data required in connection with medical institutions to be recognised for purposes of post-examination training as envisaged under the recommendations.

Medical Registration in U.K.—Under the Medical Act 1950, the General Medical Council of the United Kingdom requires every medical graduate to serve as internee in an approved institution for a period of at least one year after passing the Final M.B.B.S. examination, with effect from 1st January 1953, before he can be given full registration with a view to enabling him to practise in the U.K. There is provision for temporary and provisional registration. For further studies in the U.K. the Licensing Bodies there insist on housemanship in recognised hospitals. The Executive Committee has under consideration the question of the inclusion of Indian Hospitals in the list of hospitals recognised by the General Medical Council for the purpose.

Increase in number of admissions in medical colleges—The question of increase in number of admissions in Medical Colleges has been engaging the attention of your Executive Committee. The standard requirements for a Medical College for 100 admissions annually adopted by the Council have been circulated to all the institutions and authorities concerned. Under the direction of the Executive Committee enquiries were made from the various universities as to the number of admissions made during the last 5 years to their affiliated and constituent Colleges and the total number of beds available for teaching purposes. The information so far received

has been tabulated and noted by the Executive Committee. Here I would like to sound a note of warning to the authorities of the Medical Colleges regarding this very important matter. It is after careful thought that the Council has laid down the ratio of 1 :5 beds, of which not less than one third should be devoted to general medicine and one third to general surgery. We have also laid down the teacher-student ratio as 1 :10 and also that students should conduct 20 labour cases each under adequate supervision. The admissions to Medical Colleges should depend on the fulfilment of these provisions in the interest of efficient training, which we are all aiming at. It would be a disservice to the country to produce half baked medical men. Therefore, all concerned should take note that before a Medical College is established the requirements which have been recommended by the Council need be ensured.

Reciprocity with other countries—Before 1940, the Council used to recognise foreign medical qualifications through the General Medical Council of the United Kingdom. In the October meeting of that year, it was decided that in future, in keeping with the dignity of the Council and the national institutions concerned, the qualifications of only those countries and states who were prepared to enter into direct reciprocity with us, should be recognised. Accordingly, the qualifications of those countries and States who did not agree to this Scheme of reciprocity have ceased to be recognised after a particular date. We have since received reference through the Government of India for indirect reciprocity, i.e., through the General Medical Council, and your Executive Committee has so far adhered to the principle and that we should under no circumstances deviate from this. We shall be happy to have reciprocity with other countries, but on equal status and with honour.

Concessions to Licentiates—In 1952, the Council had decided that the period during which Licentiates could avail themselves of the concessions allowed by the Council from time to time be extended upto April 1956. In 1953, the matter was reconsidered and the Council adhered to its previous decision and resolved that no further concessions should be granted. In 1954, the Government of India intimated that they considered it desirable that the Universities should continue to provide the condensed course beyond April 1956 for 5 years upto April 1961. Under the direction of your Executive Committee it has been pointed out to the Government that the abolition of Lake Medical College, Calcutta, has resulted in an extra burden being thrown on other Colleges where facilities for training of regular students are hardly adequate. It has been added that if the Government are anxious for the extension of these concessions, Government should themselves make provision for necessary additional facilities in the different institutions as it would not be possible for the institutions to continue the condensed course beyond April 1956, and it would otherwise lead to the lowering of the standard of medical training.

Planning Committee—At the last meeting the Council had adopted a resolution regarding the formation of a Planning Committee as an advisory body. Your Executive Committee has under consideration further action in this respect.

Amendment to the I. M. C. Act, 1933—In January 1954, an amended Act as approved by the Council together with reasons for the proposed amendments was forwarded to the Government of India. They were requested that before the amended Bill is put up to the Parliament for consideration, a copy of the same might be forwarded to the Council for expression of its views on changes, if any, the Government might be pleased to make on the Council recommendations. I presume the amending Bill is being placed before the Parliament but no copy of the final form of the Bill has yet been received in the Council office. Under my directions the Government has again been requested to wait till such time as the completely amended Bill, as is being proposed by the Government for putting up before the Parliament is received by the Council for expression of its views.

Post-Graduate Medical Education Committee—At the last session I had informed you about the decision arrived at after discussion between us and the Central Ministry of Health regarding the formation of Post-Graduate Medical Education Committee under the Medical Council of India. It has been decided that the Committee would consist of 9 members out of whom 6 will be nominated by the Central Government from amongst the members of the Council and 3 will be elected by the Council.

Under the direction of your Executive Committee further action is being taken in the matter as indicated by the Central Government.

Public Health Qualifications Inclusion in Schedule—At the meeting held on the 27th March, 1955, the Council had decided that since Preventive Medicine and Public Health form an integral part of medicine, the Public Health qualifications should also be included in the Schedule as additional qualifications. The matter was referred to the Government of India who have ruled that D.P.H. qualifications cannot be included in the Schedules unless the Act is amended. They have advised us that since an amending Bill is at present under consideration the question should be taken up after the proposed legislation has been passed by Parliament.

NOTES AND NEWS

Leprosy Control Needs Hard Work

Speaking at the annual general meeting of the Hind Kusht Nivaran Sangh (Indian Leprosy Control Association) on 20-4-56 Dr. Prasad said that a nationwide problem like leprosy control could be solved only by carrying out a dynamic programme and by intensive work.

"The time has certainly come", he said, "when we cannot be satisfied with little oases of compassionate work here and there which are at best the reflection of the spirit of exceptional dedication. The spirit of dedication should spread itself so that we may sense the inspiration of it everywhere."

Successful treatment of leprosy had again created the problem of rehabilitating the cured patient. "I am sure that the voluntary associations, which have always

been the first to respond on such occasions, will come forward with constructive plans. They will naturally have the Government's sympathy and support in this work".

Problems Related to Rice Nutrition

Recent developments in respect of nutritional problems related to rice and use of rice and fields for fish culture will come up for discussion at the fifth session of the International Rice Commission to be held in Calcutta from November 12 to 17, 1956.

According to the provisional agenda, the Commission will consider the reports of its working groups on rice breeding, better fertilising practices, soil, water and plant relationships in rice production, mechanisation of rice cultivation and reduction of losses through improved operational methods. It will also have before it the progress report of the Executive Secretary on the working of the Commission since its last session held in Tokyo in October 1954.

The Commission is at present composed of 26 member countries, viz., Australia, Burma, Cambodia, Ceylon, Cuba, Dominican Republic, Ecuador, Egypt, France, India, Indonesia, Iran, Italy, Japan, Korea, Laos, Mexico, the Netherlands, Pakistan, Paraguay, the Philippines, Portugal, Thailand, the U.K., the U.S.A. and Viet-Nam.

The first meeting of the National Rice Commission appointed by the Government of India with Dr. Panjabrao Deshmukh, Union Minister for Agriculture, as Chairman, to make arrangements for the forthcoming session of the International Commission was held on 17-4-56 and 18-4-56.

Plan for Mental Hospital in Midnapore

A proposal is now under consideration of the West Bengal Government for opening a mental hospital with a capacity of about 500 beds at Jhargram in Midnapore district.

The State Government have earmarked a sum of Rs. 79 lakhs under the Second 5-Year Plan for the establishment of a mental hospital and for expenses to be incurred for the treatment of the mentally handicapped people. It has been proposed that the hospital be located in a plot of land measuring 300 acres.

At present there is no full-fledged hospital for mentally handicapped people run by the State in West Bengal. The State Government maintains 850 beds at the Ranchi Mental Hospital at a cost of Rs. 8 lakhs and a half per year.

There are nearly 150 mentally handicapped people lodged at Bhowanipore Mental Observation Ward, in different jails as also in the Government Home for the old and the insane. It has been proposed to accommodate all these people at Midnapore.

Indian Pediatric Society

A branch of the Indian Pediatric Society has been formed in the State of Uttar Pradesh under the presidentship of Dr. B. B. Bhatia. The membership fee has been fixed to Rs. 12/- annually. The members will be entitled to the monthly Journal issued by the central body.

U. P. Medical Council

The names of the following medical practitioners have been erased from the Uttar Pradesh Medical Register on March 16, 1956 under section 26 of the U. P. Medical Act III of 1917 by the orders of the Uttar Pradesh Medical Council :

1. Dr. Bodhendra Pratap Singh, L.M.P. (Agra 1924), registered with U. P. Medical Council under registration certificate No. 3984 dated April 18, 1939. 2. Dr. Amal Gupta, M.B.B.S. (Lucknow 1946), registered with the U. P. Medical Council under registration certificate No. 5187 dated July 10, 1956.

CORRESPONDENCE

The Editor is not responsible for the views expressed by correspondents

Quality of Liver Injection

SIR,—I was interested to read the article entitled "Quality of Liver Injection" by Drs. Chowdhury, Chakravarti and Bhuttacheryya in the February 1 issue of your journal (*J. Indian M. A.*, **26** : 91, 1956).

The article in question presents some, if not many, stimulating information regarding toxicity tests of liver extracts. It, however, lacks in any new idea of technique for evaluation and assessment of clinical efficacy of a given liver extract for injection. The expanding literature on the standardisation of liver extract has not yet stabilised anyone applicable to this country. The U.S.P. (oral or injectable) unit method of standardisation is directed against fixation of potency of a liver extract in P.A. Since true Addisonian type of P.A. is not, for all practical purposes, prevalent in India, the U.S.P. unit method cannot be applicable in India. Whitby and Britton quote three methods of standardisation. These three include single reticulocytic response, double reticulocytic response and a third method from increase in the red cell count after a period of treatment. Since there is no official recommendation of the method of standardisation in B.P. it appears that these three methods are advocated for assessment of potency of liver extracts in U.K. With the isolation of vitamin B_{12} from liver and its capacity for inducing haematological response in megaloblastic anaemias, the problem of assessment of potency of liver extract appeared to have reached a stage of solution. With the progress of time, however microbiological assay for vitamin B_{12} activity in the standardisation of liver extract is falling into disfavour. As a compromise, McCall suggested that the microbiological assay of liver extracts can be used for screening extracts before subjecting them to clinical trial. Thus wastage of clinical tests on poor extracts of low vitamin B_{12} content can be avoided. It may be, incidentally, stated that opinions have recently cropped up in U.S.A. even against standardisation of liver extract in

terms of U.S.P. unit specified by the Anti-Anaemia Preparations Advisory Board of the United States Pharmacopoeia. As an example it may be mentioned that Goodman and Gilman designate U.S.P. unit as an old method and have quoted 1 U.S.P. unit as approximately equivalent to 1·33 mcg. vitamin B_{12}. It seems that they prefer standardisation in terms of vitamin B_{12} content rather than in U.S.P. unit.

So far as we are concerned, the question arises as to if freedom from undue toxicity should be considered as the criterion of potency of a liver extract. I feel it is not so since a particular liver extract may have a minimum toxicity but not of required potency. I suggest, therefore, that so long as a standard method for assessment of potency of liver extract is not finally found out for India, tests for undue toxicity should only be considered to be the first step in the evaluation of a potent liver extract followed by single or double reticulocytic response tests in megaloblastic anaemia patitnts. I am etc.

Calcutta. A. C. DEY, L.M.F.

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SIR,—Evaluation of potency of liver extract is a vexed question since no reliable laboratory method has yet been established and the clinical evaluation suggested in the earlier U.S.P. being not very practicable has been replaced by the method of estimation of vitamin B_{12} content in the latest U.S.P. Clinical evaluation is not possible in this country since Addisonian pernicious anaemia cases are a rarity here. The tests suggested in the article under reference are meant for checking the uniformity of the quality of crude liver injection apart from the question of potency. The suggested test for undue toxicity is not an alternative method for estimation of potency and only speaks of safety in its use. Clinical evaluation of potency as already pointed out is far from practicable. Till any satisfactory reliable laboratory method of assay is established, estimation of vitamin B_{12} should be our guide of potency of the preparation and this has been officially recognised in U.S.P. XV and recommended in the draft amendment of the Drugs Act. I am etc.

M. D. CHAKRAVARTI,
Calcutta. B.SC., M.B., D.PHIL.
Director, Central Drugs Laboratory.

REVIEWS

The Year Book of Drug Therapy (1955-56 series)—Edited by Harry Beckman, M.D. Published by the Year Book Publishers Inc., 200 East Illinois Street, Chicago 11, Ill., U.S.A. Board bound with cloth, 560 pages; price $6.00 post paid.

This handy book is one of the 13 volumes comprising the Practical Medicine Series of Year Books. It has been neatly produced with clear readable types with good paper and binding. The subject matter has been ably dealt with by subdividing the same into several convenient chapters. Comments by the editor, here and there, at the end of the abstracts and the 23 questions in the form of a quiz (in a separate paper enclosed with the book) are stimulating. The articles abstracted are from journals received between August 1954 and August 1955. Careful study of this volume would enable a practitioner to keep abreast of the times, not only in the matter of newly introduced drugs but also to newer and fuller knowledge about the applications and limitations of drugs in therapeutic practice.

Polymyxin, Neomycin, Bacitracin—Antibiotics Monographs No. 5.—By Ernest Jawetz, M.D., PH.D. A publication of Medical Encyclopedia, Inc., New York. Distributed outside U.S.A. through Interscience Publishers, Inc., 250 Fifth Avenue, New York, N.Y., U.S.A. Board-bound, 96 pages, 1956; price $4.00.

This is the fifth volume in the Antibiotics Monographs series, published under the editorial direction of Henry Welch, PH.D., and Felix Marti-Ibanez, M.D. The three antibiotics discussed in this book are somewhat unique amongst the 17 antibiotics available commercially in the United States. The first and the third are polypeptides and, even though Neomycin is not one such, the toxic side reactions following their clinical use pursue a similar pattern. The antibiotics consequently have a limited, but very useful, range of therapeutic use. This is more so nowadays, especially because of the various infecting micro-organisms (in all countries) gradually becoming resistant to the more commonly used antibiotics consequent upon their being used widely, and often indiscriminately. This book—the author of which had undertaken extensive investigations on these antibiotics—would greatly help the reader to a better and further knowledge of the dosage, pharmacological properties and suitable use of these three antibiotics.

The Treatment of Eczema in Infants and Children—By Lewis Webb Hill, M.D., pp. 76 (10″ × 6¼″). Published by The C. V. Mosby Company, St. Louis, 1956.

Eczema, a common disease in infants and children, is a problem to the mother and the physician. The author, Dr. Lewis Webb Hill, has successfully dealt with the subject in a practical manner. This book is sure to be of much value to the practising pediatrician who usually deals with such cases in the initial stages. The subject is covered in 76 pages, with 39 illustrations. Expression is lucid and understandable even to a beginner. Paper and printing are of high quality.

The Indian Practitioner, January 1956. Special Number on Respiratory diseases.

The issue under review contains 22 articles on various respiratory diseases. Ten articles are well written and will be useful to the general practitioners for whom the journal is meant. All the topics, however, do not seem to have been well chosen. There are two articles on the same subject in two instances, as on "Respiratory Emergencies" and "B.C.G. Vaccination. There are some notable omissions.

SUPPLEMENT
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XV BENGAL PROVINCIAL MEDICAL CONFERENCE, JALPAIGURI

The 15th Bengal Provincial Medical Conference was held at Jalpaiguri on 4-6 February 1956. Dr. C. C. Sanyal was the Chairman of the Reception Committee. Dr. A. C. Ukil, the President of the Indian Medical Association inaugurated the conference. Dr. A. K. Bose performed the function of installation of the President-Elect, Dr. N. K. Munshi.

Dr. C. C. Sanyal accorded a hearty welcome to the delegates and guests. In his speech he gave a history of Jalpaiguri and described its physical surroundings, its natural beauties and other attractions. He discussed the health conditions of the people with particular reference to some of the diseases viz. leprosy, tuberculosis etc. which call for immediate remedial measures. He also pleaded for the establishment of a Medical College in North Bengal.

Dr. A. C. Ukil in inaugurating the conference said in course of his address, "Studies by various workers have shown that 70 per cent of our illnesses can be eliminated by raising the standard of living with regard to food, clothing, education, housing and social security and that with regard to the remainder, the improvement of environmental sanitation and of working conditions cover a substantial ground. Modern public health, which is an integral part of social services with regard to these, has to be paid for. Socio-economic advance is, therefore, inevitably linked with the reduction of illness and improvement of health. No improvement of health status can be achieved without the simultaneous development of national reconstruction. The Community Development schemes, envisaged in the 5-year National Plans are likely to make a tremendous change in the outlook of the people, provided you can mobilise their whole-hearted co-operation."

Dr. A. K. Bose in performing the installation of the president-elect pointed out that the effective development of the Association leading to professional solidarity can be achieved in two ways (1) through numerical strength of the organisation and (2) through its ideological forces. He said "The I.M.A., the national association is your own organisation. Join it and give it the benefit of your considered opinion and make it strong." He further said "Our association is not a mere club, it is a scientific workers' association with a bias towards the social application of science. We should set up the model of professional ability and integrity, prepare the blue print of allied objectives of relief, education and research for the nation to accept and in doing so, shall seek co-operation and render the same to all, keeping science and service as one-yard-stick of acceptance."

The Presidential Address of Dr. N. K. Munshi, the President of the Conference was then read out, as he could not be present. Extracts of the speech are given here-under.

In India people die in their thousands from diseases which, according to medical knowledge, are hundred per cent preventable. While modern geriatrics fights against senility and old age—here infant mortality rate is still staggering (115·9 per thousand in India in 1954, as against 25·4 in U. K. and still less in U.S.S.R.). While medical research probes into the question of longevity, here the average expectation of life is less than 30 years; and when in scores of clinics and hospitals in other countries the age-old dream of "painless births" is being successfully realised, about 200,000 mothers die every year in India from child-birth. In our country, normal life is full of hazards; the state of affairs is indeed abnormal.

It is true that India has to bear a sad legacy—the British rule left in its wake, proverty, ignorance, dissension and misery. Under them, modern industries were not developed, agriculture remained primitive and in a state of chronic decay and public health measures were hopelessly inadequate. But at the same time the fact remains that we have attained our freedom and very soon it will be a decade since we became our own

Dr. C. C. Sanyal, The Chairman of the Reception Committee.

masters. Judged in this light, it appears that we have little occasion to feel satisfied about matters as they now stand. To take up a topical example—let us remind ourselves of the recent epidemic in the Capital of India —infective hepatitis. A good deal of studied silence and evasive innuendoes failed to hush up the fact that primitive water supply system was responsible for the event, which caused widespread sufferings and even several deaths.

In West Bengal, due to similarly unsatisfactory water-supply system, every year Cholera, Dysentery, Enteric and such other water-borne diseases ravage the towns and countryside. In 1954 alone, 27,500 lives were lost from water-borne diseases. It is a crying shame that 'Except in Calcutta, there is no epidemic of cholera in

any city of the world with a population of 1·0 million'. (U.N.O. Health Report, 1951-52.)

In the recent past, as the President of the Students Health Home, Calcutta, I had the good fortune to spend a few days in China. It is a common knowledge that until a few years back, the city of Shanghai had one unique distinction. It was known as the plague-spot of the East. There the annual toll of Cholera used to be 2-3000 human lives, another several thousands died from small-pox and other epidemic diseases (in Calcutta mortality from Cholera was 2,100 in 1953). But in China only a few years after liberation, all these just became ancient history; in 1953 (14th April issue) "The Statesmen" laconically informed that there was not a single case of Cholera in Shanghai! The Chinese had no secrets behind this miracle. They are still less industrially developed than we are, they suffer from a scarcity of medical personnel, and yet they were able to achieve this significant result. It was just a bit of efficient public health measures. This shows what efficient preventive measures can achieve.

On behalf of the Indian Medical Association, we had been urging for a considerable period of time that immediate measures must be taken to ensure protected water-supply to village and urban population, that preventive inoculation and vaccination must be thorough and should start several months before the outbreak of actual epidemic. To quote from W.H.O. Experts Committee. "The annual cost of Typhoid fever, Diarrhoea and Enteritis for 100,000 inhabitants has been estimated at $138,000. It would appear that the savings to be derived from the reduction of diseases would pay off the cost of installation in the short span of three years". . . . . Such being the fact, protected water-supply and universal inoculation and vaccination must become the watchword of our public health.

In the recent years, there has been a gradual decline in the incidence of Malaria in West Bengal and consequently in the rate of mortality. It is largely due to the adoption of preventive and sanitary measures in rural areas, which will no doubt evoke from all of us a sincere spirit of jubilation. However, during this time, very little has been achieved in the case of a far more potentially dangerous malady—I mean tuberculosis.

With every passing year tuberculosis is assuming a more menacing character. It is pointless to emphasize the urgency when the Union Health Minister declares that in India there is one death per minute from this disease or when the State Chief Minister states that in the city of Calcutta, almost one in every family suffers from it (*vide* Dr. B. C. Roy's statement in May 1955, while inaugurating Deshbandhu Chest Clinic at Darjeeling). But the problem is not only with a staggering number of tuberculous patients; in Calcutta alone, it is estimated that there are over 40,000 of them. More alarming is the wide and unchecked dissemination of this malady amidst overcrowded, under-nourished and unprotected citizens, through the medium of 'open cases'.

B.C.G. vaccination of children and infants, which is gradually becoming extensive, is no doubt welcome, but a control of tuberculosis is hardly to be expected if the scope of diagnosis and the facilities of treatment remain as in the present state. Isolation is scarcely practicable if the number of cases continue to soar upwards.

An estimated number of 30,000 t.b. beds is required in and around Calcutta, whereas for the whole of West Bengal, the number is only 2283. In 1952, the total number of Chest Clinics in West Bengal, numbering 23, treated a total of 38,000 people suffering from pulmonary tuberculosis and for the same year a conservative estimate of the total incidence of the disease comes to about 1,50,000. Its prevalence amongst the poorer strata of people and the prohibitive cost of prolonged treatment, make the possibility of private treatment extremely remote. Thus it becomes obvious that a overwhelming number of sufferers from tuberculosis do not get the facilities for proper treatment and care.

Together with the measures for better living conditions, provision must be made for creating new chest clinics and increasing the number of free beds every year, so that real treatment may be afforded.

Perhaps, the most effective and immediate way of relief would be through the establishment of a network of clinics for speedy diagnosis of early tuberculosis and its systematic treatment. The many non-official organisations which are working in similar lines are to be given financial and other assistance and are to be brought within such a planned drive.

The youth and students are the worst victims, their age makes them most vulnerable to the infection. It will, therefore be natural to adopt methods particularly for their protection. I believe, that if the various youth and student organisations are taken into confidence and utilised properly—they will surely become a factor of significant importance in the control of tuberculosis. They will be able to propagate sanitary measures, to act as organisers and volunteers in routine check-up in schools and colleges and at other places where the youth assemble and above all will be able to gather support and confidence behind official measures.

An almost catastrophic situation also prevails in the general hospitals of the city. The hospitals are overcrowded, the out-patients departments cannot cope with constantly rising number of attending patients, and the diagnostic departments are on the verge of collapse.

The now existing unsatisfactory conditions prevailing in the hospitals sometimes give rise to unpleasant bickerings between the doctors and patients. This is all the more unfortunate. In the midst of such mud-slinging our vision can not be but coloured, our perspective cannot but be clouded. Neither are patients by nature choosy, nor are the doctors oblivious of the duties and ethics of their profession. Both are victims of the same tattered system that can no longer hold out without radical improvement. The emphasis has to be given on the initiative from the Government.

To my colleagues, I should like to say that the doctors are, no doubt, working under the most trying conditions. But the fact remains, that we cannot ignore the watchword of our profession 'service to the distressed humanity'. I am sure every member of our profession will face the hardships with courage and reason. Because, after all it is our people—our own brothers and sisters who are sufferers.

I am, however, alive to the situation that unless health service is planned in a manner which will give a sense of security to the millions of our citizens, such an impasse will continue.

No doubt, the arrangements in the city hospitals need radical improvement by way of increased number of beds, equipment and personnel but exactly similar emphasis is also to be laid in the District and Mufussil hospitals apart from setting up numerous rural health centres. This alone will not only reduce the heavy burden in the city hospitals but will also alleviate the distressing features of our ailing rural and urban population. Every hospital must have a department which will keep liaison with the private medical practitioners. Through this department, the specialists attached to the hospitals, should communicate with the private practitioners, giving them all information regarding the diagnosis and the line of treatment of the patients referred by them to the hospital. The hospital may not undertake to treat such a patient unless so desired by the doctor and his patient; this will eliminate the feeling of estrangement between the hospital and the private practitioner.

For the huge number of out-door patients, a simple measure of immediate remedy would be to open up evening departments with the appointment of extra staff. Also the medicines supplied from the Outpatients' Departments must be increased to include vitamins, chemotherapeutic drugs and antibiotics. There is little satisfaction in getting ailments diagnosed, when treatment remains beyond the reach of the average patient.

As an ophthalmologist I shall naturally have an inclination to speak something about eyes and I could find no subject better than prevention of blindness. In a sample survey of 292 villages done by the Association for Prevention of Blindness in Bengal, it was found that the incidence of blindness was 100 per 100,000 population, that 50 per cent of this blindness was curable and 42 per cent preventable and 8 per cent unavoidable. Village people are ignorant about hygiene of the eyes and have no knowledge about what modern medicine can do. They, therefore, fall an easy prey to the quacks. Here the general practitioner has his role to play. He should have a good deal of knowledge about the causes and prevention of blindness, which he can beneficially apply on his patients.

All these problems must find their proper places in the Blue-print of the second five years plan for national development. No plan for national upliftment can achieve its aim, if the vital problems of health of the nation remains ignored. More attention than usual is demanded in such vital and urgent aspects of Public Health like prevention of epidemics, filtered water-supply, extension of maternity centres, training and employment of medical personnel and organisation of medical research.

The per capita caloric intake in India is still one of the lowest in the world. In 1954, it was only 1641. This situation calls for measures to protect particularly the children, the growing boys and girls and of course the mothers. Free supply of milk for mothers and infants in maternity clinics, subsidised or free tiffins in the schools and colleges through Secondary Education Board and University schemes are to be encouraged.

In this connection, measures must be employed to completely eradicate adulteration of food products, which must become a cognizable offence and should deserve exemplary punishment. The unscrupulous men, who resort to such nefarious practices, are the worst criminals in our society. It is again a wonder, while 'backward' China has solved this menace long ago, we have yet to ensure unadulterated food supply.

It is also to be urged that long-standing grievances of medical men should be given the consideration they deserve and a national health plan should be drawn up. India does not possess sufficient number of qualified medical graduates sailing off to distant countries in order to make a living. There are vast areas where no qualified medical men are available and at the same time there is unemployment which is growing. I have heard it said that a peculiar fascination for city life attracts medical men to urban centres and that happens to be the cause of all unhappiness. It is not true. Lack of security and future prospects and the extreme poverty of the village population, makes young people shy of the countryside. I am sure that if their practice is subsidised by the State—many will be willing to establish themselves in the villages. Further, long overdue rural health centres must be opened.

There should also be a special endeavour to end the rule of quackery in our land. All qualified medical practitioners will have to register themselves and antibiotics and sulfa drugs etc. should not be dispensed without a proper prescription. This is vitally necessary if scientific treatment is to find its rightful place in our country.

The facilities for medical research must be widened. The scope of postgraduate education and research is insufficient to the extreme and in West Bengal it is even more so. Absence of proper equipment coupled with miserly remuneration is enough to cripple the research incentive of any aspiring young scientist. While medical education should be planned to produce the required number of qualified men needed for our country to-day, every teaching institution, should also be a centre of post-graduate teaching and research work.

Finally, a few words about the Employees State Insurance Scheme which was at last introduced in August last in Calcutta and Howrah. Although the Indian Medical Association welcomed its introduction, we all know that it has only a limited value. To be candid, we never harboured the illusion that the scheme is complete in itself, rather to us it appeared to be a supplementary medical service which together with the existing ones and after suitable modifications in the course of its workings, will prove to be of great benefit to the labouring population. It will shortly be six months since its inception and some concrete assessment is now feasible.

The first reaction that will strike anybody interested in it, is the manner in which it is being used to destroy the facilities existing from before. There is a move under way to dispense with the services of factory medical officers and to put all responsibilities on the shoulders of the panel doctors. This is a very dangerous indication : the rudiment of industrial hygiene and medical health services which was incorporated in industrial concerns after years of effort, will thus be destroyed in the name of E.S.I. Scheme. Factory Medical Officers must be retained, rather their services should be extend-

DR. N. K. MUNSHI, THE PRESIDENT OF THE CONFERENCE.

ed and improved in order to protect the workers against industrial hazards and occupational diseases, for routine check-up and first aid measures. So far as the panel doctors are concerned, their problems are many, but the following must be immediately done if their services are really to be made effective :—

1. Simplication of paper work. 2. Increased list of costly drugs available for prescription. 3. Availability of more diagnostic facilities for general medical work. 4. Proper co-ordination with specialists and hospitals.

The specialists' services and the diagnostic facilities are really deplorable. The face of an insured worker is no better and perhaps worse than an average patient of the outdoor. Firstly, the number of specialists are pitifully meagre and then they are usually the same staff employed in the existing hospitals. Over and above the usual patients, a specialist on an average has to examine no less than sixty workers per sitting. The over-

worked pathological and radiological departments have been asked to bear the brunt of the insured workers. The E.S.I. Authorities like the proverbial Brahmin's milch cow, expects to get everything out of almost nothing.

The same picture is revealed in the case of hospitalisation. Without increasing the total number of beds, a small number of them has been requisitioned under the scheme. It fails to satisfy the workers and on the other hand increases the difficulties of the general public. The emergency beds for injured workers also fail to guarantee proper care to the victims of industrial accidents.

The working of the E.S.I. Scheme eloquently reveals that bureaucracy and ignorance are destined to destroy the very foundations of any scheme which, if utilised properly, would have accrued benefit.

I must conclude—but before that I must mention about the difficulties of our colleagues in the Tea-Gardens. It will, no doubt, be a great dereliction of my duties if in the Tea Town of West Bengal, the grievances of the Medical Officers of the Gardens do not get expression. Although, I am personally not very much acquainted with the mysterious land of the 'two leaves and a bud' I am very much alive to the fact that the Medical Officers in the tea plantations suffer from certain inconveniences and the Indian Medical Association had to intervene on their behalf in the recent past. But I must emphatically assure that our friends, who remain cut off from the greater part of the outside world in course of their duties, will not be forgotten by us and their problems will continue to agitate us till they are remedied.

In order to achieve any objective we must work through an organisation. The weight of an organisation depends on its numerical strength and its solidarity. So I appeal to every qualified man to join I.M.A. and say "give the association your wholehearted support and the I.M.A. will then be in a position to mould the public health programme of our country for all times to come."

The following resolutions were passed at the Conference :

1. *On Conversion of Buxa Dooars Camp to a Tuberculosis Sanatorium*—In view of the fact that the district of Jalpaiguri has got no Tuberculosis Hospital though the incidence of the disease is increasing, and in view of the fact that the former Buxa detention camp is serving no useful purpose to-day and which has enough accommodation for a Hospital including the quarters for medical cum ancilliary staff, it is resolved that the Government of West Bengal be moved to convert the said Buxa Camp into a properly equipped Sanatorium for Tuberculosis patients as early as possible.

2. *On Hospitals and Health Centres*—This Conference deplores the refusal by the Government of West Bengal of the most legitimate proposal put forward by the Indian Medical Association to constitute a Public Enquiry Commission to go into the question of public grievances against hospital management. This Conference is not inclined to believe that all is well in the sphere of hospital management both in the cities as well as in muffasil areas as stated by the Government in their communications and reiterates its demand that an Enquiry Commission with representations from the Press, the Public, Government and the Indian Medical Association be immediately formed for the purpose.

3. *On Proper Scientific Medical aid to the Rural Population*—This Conference while welcoming the declaration made by the State Government of the principle of increasing the remuneration of the Medical Officers serving in rural areas, is of the opinion that in order to provide proper scientific medical aid to the rural population immediate steps should be taken—

(*i*) to properly equip and man the district, subdivisional and Thana Hospitals including provision for Specialists' Service

(*ii*) to expedite the establishment of Thana and/or Rural Health Centres and Chest Clinics with priority to epidemic stricken and disease ridden areas irrespective of whether the local inhabitants are able to donate cash or land for the said purpose

(*iii*) to reorganise the Advisory Bodies or Visiting Committees as the case may be by including the representatives of local popular organisation and the local branches of the Indian Medical Association.

(*b*) The Conference is of opinion that the existing system of supplying only ordinary stock mixtures and medicines from the out-patients' departments deprives a large number of patients from receiving the benefit of modern scientific treatment. The Conference therefore urges upon the State Government to arrange to supply essential drugs and medicaments, especially antibiotics and other specific curative medicine to needy patients both in Government and non-Government hospitals.

(*c*) The Conference regrets to find great discrepency in the facilities offered for the treatment of indoor patients of the hospitals of Calcutta and district and rural areas. The Conference considers this state of affairs unjustifiable and demands that a uniform method of supplying medicine and diet should be adopted to all inpatients in different hospitals in the State.

4. *On Medical Education and Advanced Studies in Medicine*—

(*a*) This Conference regrets to note that the authorities of the School of Tropical Medicine and the Government of West Bengal have given no consideration to the recommendations of the Indian Medical Association to re-open the D.T.M. Course which was so long open to all medical men with registrable qualifications.

While reiterating the resolution passed in the All-India Medical Conference held at Hyderabad in 1953, and in subsequent Conference, this Conference urges upon the members of the Governing Body of the School of Tropical Medicine to reconsider the importance of the problem and to re-open the course without further delay.

The Conference further requests the Chief Minister and the Minister of Health to intervene in the matter for a speedy solution of the problem on the light of the recommendations of the Indian Medical Association.

(*b*) In view of the fact that all the four Medical Colleges in West Bengal are located in Calcutta and causing undue pressure on these colleges and hospitals and thereby involving increased cost of medical education and consequent deprivation and hardship to a considerable number of students, the Conference urges upon the Government of West Bengal to take immediate steps to establish medical colleges in places where there had been medical schools in the past with a planned programme of decentralisation of medical education and consequent effective medical relief to the rural areas.

This Conference is of opinion that in view of the special geographical situation of North Bengal with difficulty in communications, preference should be given to Jalpaiguri in the execution of the aforesaid principle.

Further, this Conference respectfully requests the Chancellor of the Calcutta University to accord immediate approval to the decision of the Senate taken in January, 1954 in sanctioning the opening of a Medical College at Bankura.

5. *On advanced studies for the Medical Licentiates*—In view of the fact that it is not possible for a considerable number of medical licentiates to undergo condensed M.B.B.S. course for obvious reasons and who have no other facilities for specialised or advanced studies in different branches of medicine, this Conference resolved that a special committee be set up by the State Government in collaboration with the University of Calcutta and the Indian Medical Association to devise ways and means to find out avenues for affording facilities for advanced studies for these members of the profession.

6. *On Post-graduate Medical Education*—This Conference urges upon the University of Calcutta to establish a University College of medicine for imparting Post-Graduate Course to institute Post-Graduate studies in Medicine.

This Conference while welcoming the proposal of the State Government to initiate Post-Graduate studies in some branches of medicine at Karnani Memorial Hospital, is of opinion that Post-Graduate department of Medicine should be under the direct control of the University of Calcutta as in other branches of Art and Sciences, and requests the State Government to take steps as would enable the University to take over the institution.

This Conference is emphatically of opinion that such step as above is long overdue and adequate funds should at the same time be made available both by the Central and Provincial Government for the establishment of a University College of Medicine. With a view to establish such College of Medicine of the highest international standard, this Conference urges uuon the State Government and the University to constitute a high power Committee and consult the Indian Medical Association and other organisations interested in such a project.

7. *On Employees' State Insurance (Medical Benefit) Scheme*—

(*a*) This Conference fully endorses the views expressed by the Central Working Committee of the Indian Medical Association that with the industrialisation of the country, the services proposed to be rendered to the industrial workers under the Employees' State Insurance fall far short of the Health needs of the workers, in as much as the Scheme does not include such aspects of health measures, as the preventive work, re-employment examination, periodical health examination, giving immediate medical relief in accident cases inside the Factories, rehabilitation of the disabled etc.

The Conference therefore feels that the Factory Act should be amended in such a way as to make it obligatory for the Industrial establishments to appoint full time or part-time medical officers as the circumstances demand, with appropriate equipment, as supplementary to the Employees' State Insurance Scheme.

The Conference is of further opinion that till the Factory Act is amended as suggested, the status quo arrangements of Factory Medical Service be maintained, so as to ensure facilities for such health services to workers as are not provided under the Employees' State Insurance Scheme.

(*b*) The Conference requests the Government of West Bengal to make necessary arrangements for speedy extension of the Employees' State Insurance Scheme to other industrial areas and also to cover the families of the insured workers under the scheme.

(*c*) In view of the fact that the present provisions of the Employees' State Insurance Scheme is applicable only to those who are under service and the facilities are withdrawn as soon as the insured person loses his or her job, the Conference urges upon the State Government of West Bengal to formulate and give effect to a comprehensive health scheme for the unemployment such affected under the scheme as early as possible.

(*d*) This Conference places on record, with deep regret, the decision of the Employees' State Insurance Corporation and other authorities concerned to withhold the prorata payment to the Panel Insurance Practitioners under the Employees' State Insurance Scheme in lieu of the capitation fees on quarterly basis of those insured workers who have not registered themselves with any Panel Insurance Practitioners as per proposal accepted in the Conference between the representatives of the Government of India, Employees' State Insurance Corporation and the Indian Medical Association held at Delhi on 3rd February, 1954.

In view of the fact that Panel Insurance Practitioners accepted the low annual capitation fees only in anticipation of the success of the new schemes and of the proposal stated above, the Conference further requests the Employees' State Insurance Corporation and the authorities concerned to reconsider the question and to take an early decision to offer the deserved prorata paymcent benefit to the Panel Insurance Practitioners.

8. *On Water Supply*—This Conference notes with concern that, whereas, considered at the average rate of one for every 200 persons, at least 98,230 tubewells are required to provide adequate safewater to about 1 crore 96 lacs of rural population of West Bengal, the actual progress made during the last five years was on an average 668 new tubewells per year. While under the existing rate it will require about 106 years to reach the target figure, the provision of rupees three crores for Rural Water Supply under the Second Five Year Plan is not expected to improve the situation to any appreciable extent. In this connection it should be noted that inspite of all that has been said and done the average deaths from preventable water borne diseases during the last four years were about 27,900 per year.

Under such circumstances the Conference urges upon the State Government to provide for adequate funds in the Second Five Year Plan, even by necessary readjustment of the budget, so that the required number of tubewells and other methods of supplying safe water where necessary, may be reached by the end of 1961. The Conference further urges upon the State and the Central Governments to grant the sum of Rs. 15 crores sought by Calcutta Corporation for the augmentation of filtered water in the city through introduction of single system of supply so as to put a stop to yearly outbreaks of epidemics of water borne diseases.

9. *On Deteriorating Public Health conditions and Economic Crisis and Unemployment amongst Doctors*—This Conference expresses its grave concern at the failure of the Government to put a stop to the increase in the incidence of various diseases and mortality thereof for lack of proper medical care, while a large number of qualified medical men are kept idle and unemployed.

This Conference demands that suitable steps be taken immediately by the Government for :—

(1) Increasing the number of Rural Health Centres with proper equipments and personnel;
(2) Arranging subsidised medical practice in rural areas till one Rural Health Centre is established in each union;
(3) Immediate opening of free medical relief units on a permanent basis in those areas which are frequently affected with flood and famine.
(4) Increasing the number of doctors and ancilliary personnel in the existing hospitals and health centres for keeping pace with the increasing pressure on their services and for the best attention to the patients giving preference in the recruitment to suitable qualified local medical men;
(5) Properly equipping the muffasil hospitals;
(6) Introducing effective public health measures in affected areas within a declared scheduled period with a view to eradicate repeated outbreaks of preventible diseases.

(10) *On Quackery*—This Conference is of considered opinion that Quackery in medical practice is highly detrimental to the interest of public health and heathy growth of medical sciences. Practice of modern scientific medicine as it stands to-day, is not only extremely delicate but depends largely upon the knowledge of basic sciences.

In view of the fact that quackery exists and flourishes mainly due to lack of suitable provisions for scientific medical aid within easy reach of the common man and as a result of which people are forced to depend on whatever medical assistance is available, this Conference urges upon the Government of West Bengal—

(1) to adopt suitable legislation for banning the practice of Scientific medicine as a profession by unqualified

and unregistered persons, at the first instance, in those areas where sufficient number of registered medical men are available according to an accepted standard of proportion to the population requiring medical aid—

(2) to make practical arrangements for rigorous implementation of the Drug rules, if necessary, by an amendment of the same, so that drugs may not be available to any body without prescription of registered medical practitioners

(3) to expedite the establishment of Rural Health Centres and immediate introduction of subsidised medical practice particularly in those rural areas where sufficient number of qualified medical men are not available.

The Conference likes to impress upon all concerned, including the press and the public, that medical profession is opposed to quackery with the sincere object of making proper scientific medical aid available to the people, irrespective of individual financial ability to procure the same and also with a view to raising the standard of Medical Science. Along with the implementation of the aforesaid demands, the Conference is of opinion that attempts should be made to utilise these unqualified persons at present engaged in medical practice, after a course of training, as Auxiliary Health Personnel whereby the problem of lack of trained personnel can be solved to a great extent.

11. *On the Increasing Menace of Tuberculosis*—This Conference views with grave concern the rapid increases in the incidence of tuberculosis due to various factors, e.g. mass scale malnourishment, unhygienic housing, living and working conditions, and unemployment. This Conference regrets to note that the existing arrangements for controlling the diseases are not only insufficient but there is no planned utilisation even of the existing resources. Since mere admission of failure to tackle the problem and repetition of these insufficiencies do neither help tackling this menacing situation nor can console the people for an indefinite period, this Conference urges upon the Government to take the following immediate practical steps for the effective control of tuberculosis :—

(1) Improving the nutritional standard of the people and arranging for milk supply, free or at subsidised rate for the needy children and nursing mothers. Providing adequate nourishment and care for children in the infected homes and providing regular health examinations of and free mid-day tiffin to the school children.

(2) Improving cheap isolation centre in over-crowded and badly affected industrial areas, especially for open cases whose home conditions are favourable for the spread of the diseases.

(3) Opening sufficient number of chest clinics in both urban and rural areas with provision for home visits and domiciliary service particularly in industrial and other areas where incidence of Tuberculosis is rampant and making provision for free supply of Anti-tuberculosis Drugs to indigent patients.

(4) Enacting suitable laws providing benefits of leave with full pay to all affected employees during their treatment period and until they are able to rejoin their work.

(5) Carrying out vigorous anti-tuberculosis campaign to educate the people.

(6) Arranging for rehabilitation of the cured and 'arrested' cases.

(7) Carrying out mass B.C.G. vaccination scheme more thoroughly, scientifically and energetically.

12. *On Association of the Members of the Indian Medical Association in Teaching Institutions of Homoeopathy or Indigenous System of Medicine*—This Conference draws the attention of the medical profession and the Government of West Bengal to the resolution of the Central Working Committee held at Trivandrum in October, 1955 in which it was stated that—

"The Working Committee is of the opinion that the association with the members of the Indian Medical Association either, in the teaching of preclinical and clinical subjects in institutions of Homoeopathy or indigenous system of medicine and modern medical systems inferior to the standard accepted by the Indian Medical Association, or in the practice of the profession with practitioners who are not eligible to become members of the Indian Medical Association is detrimental to the maintenance of the minimum standards of medical education and relief in the country. As such it is desirable that the members should desist from such activities. All branches of the Indian Medical Association are requested to discuss this resolution and create favourable opinion", and request the Indian Medical Association of this State and the Government of West Bengal to give effect to the aforesaid recommendations.

13. *On Opening Training Centre for Ancillary Hospital Personnel at Jalpaiguri*—In view of acute dirth of properly trained anciliary Health personnel such as nurses, creche-workers and midwives especially in North Bengal area whose services are urgently required, particularly for implementing the provisions of health services under the plantation labour Act and also for the development programme under the Second Five Year Plan, this Conference urges upon the Government of West Bengal to take immediate steps to open a Training Centre at the Jalpaiguri Hospital for the aforesaid purpose.

In this connection, this Conference notes with satisfaction the attitude of co-operation expressed by the Indian Tea Planters' Association to fulfill the said objectives.

14. *On Utilisation of Nuclear Energy for Peaceful Purposes*—This Conference unequivocally supports the efforts of the Government of India for the abolition of the use of Nuclear weapons in War and welcomes the idea of utilisation of the infinitely powerful and almost inexhaustible source of energy exclusively to raise the standard of living conditions and improvement of the health of the people.

15. *On Merger of West Bengal and Bihar*—This Conference notes with deep concern the recent proposal for merger of West Bengal and Bihar into a single State. Considering the genesis of the event which culminated in the idea of merger and the subsequent parochial attitude of many responsible people of both the States, as revealed in their various pronouncements on the issue even at this stage, this Conference is of considered opinion that this proposal for the merger of the two States is inopportune and cannot be at this stage of any benefit to the people of the two States, whereas it has in it the basis of enhancement of discord and strife between the two States even on many minor matters, thereby endangering the future possibilities of establishing the unity of India on a more stable and effective socio-economic basis at a higher level of human thought process.

This Conference requests the sponsors of the proposal to withdraw the same for the sake of establishment of better relation between the States and the Unity of India.

XXXIII ALL-INDIA MEDICAL CONFERENCE, 1956

The 33rd All-India Medical Conference will be held in December 1956 in Trivandrum. A Reception Committee with Dr. C. O. Karunakaran as Chairman and Dr. B. M. Ambady as General Secretary has been formed. The Committee has already started to function.

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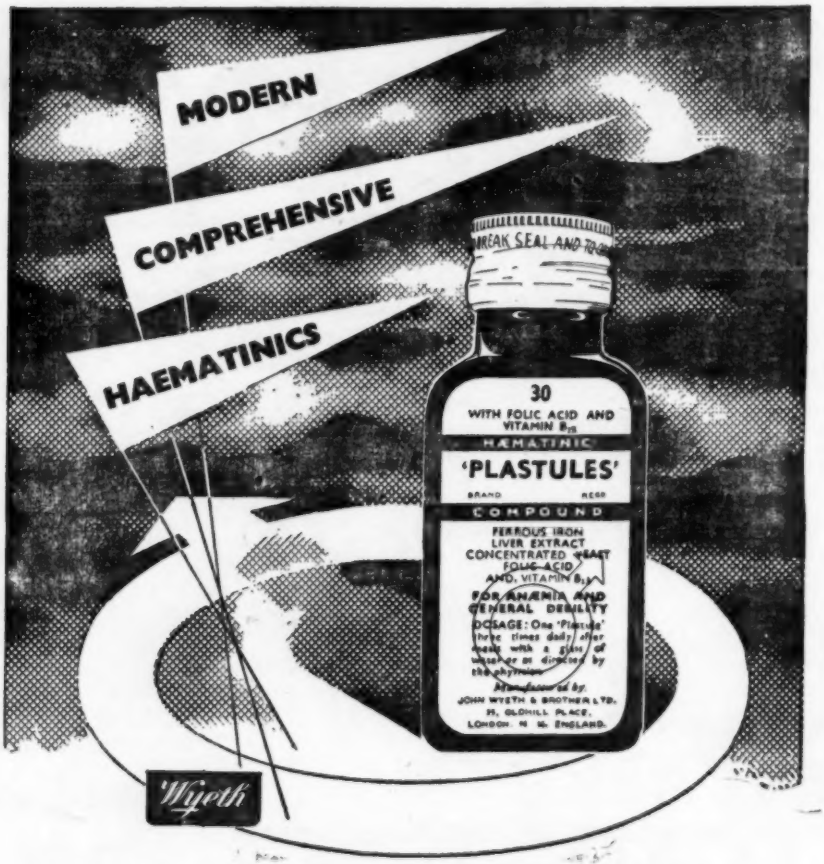

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